

THE LEAF AND TWIG MINING BUPRESTID BEETLES OF MEXICO AND CENTRAL AMERICA.

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This paper is the result of a study of the Buprestid beetles of the Tribes Agrilini (Group Trachytes) and Mastogenini from Mexico and Central America, in the collection of the United States National Museum. In 1910 the Smithsonian Institution organized a Biological Survey for the study of the fauna of the Panama Canal Zone, which was made during the winter of 1910-11. The greater part of the material recorded in the present paper has been collected by Messrs. E. A. Schwarz and August Busck, who were detailed by the Bureau of Entomology to make a study of the insect fauna in connection with the survey.

The present paper includes all of the described species of these two groups from Mexico and Central America, with the exception of a few species which are unknown to the writer, and which have the descriptions so incomplete as to make it impossible to correlate the characters given in the original descriptions with those used in the keys. One genus and 42 species are described as new, and the types of all these new species are in the National Museum. Quite a number of the old species are not represented in the National Museum Collection, but to make the paper more complete these have been included in the keys solely upon the characters given in the original descriptions, and also their distribution, so far as known from the literature. The keys are not intended to show the taxonomic relation of the species, but simply to assist in their identification. It has been impossible to show the true relationship of the species at the present time, on account of not having sufficient material available for study, but it is hoped that it will stimulate the collecting of these small interesting beetles, which can be taken by sweeping the flowers and foliage of miscellaneous plants.

Nine genera and 111 species have been previously described in these groups from Mexico and Central America, and the number is increased to 10 genera and 153 species in the present paper.

The writer will be glad to identify material in these groups at any time.

Tribe AGRILINI.

Group TRACHYTES Lacordaire.

Trachydes LACORDAIRE, Gen. Col., vol. 4, 1857, p. 86.

This group of the tribe Agrilini, besides the genera given in the following key, also includes the following genera: *Cylindromorphoides* Kerremans, *Anthaxomorphus* H. Deyrolle, *Germanica* Blackburn, *Aphanisticus* Latreille, *Endelus* H. Deyrolle, *Paratrachys* Saunders, *Stenianthe* Fairmaire, *Pseudianthe* Fairmaire, *Sponsorinus* Fairmaire, and *Janthe* Marseul, none of which are found in the Western Hemisphere except the genus *Cylindromorphoides*, which was erected for a slender species from Brazil. The species of this group are distinct from all the other *Agrilini* in having the median coxae more widely separated than the anterior ones, anterior margin of the posterior coxae only slightly concave, and the tarsi very short.

In this group the body is usually broad and ovate, sometimes, however, elongate and slender; in both cases they are usually narrowed behind. The front of head is strongly narrowed by the insertion of the antennae, which have the poriferous fossae terminal; antennal cavities large and situated a certain distance from the eyes; base of pronotum sinuate at the sides, with a median lobe; scutellum triangular and sometimes very small; prosternum very variable in form; sternal cavity for the insertion of the prosternal process formed entirely in the metasternum, the mesosternum being widely divided; middle coxae more widely separated than the anterior ones; hind coxal plate but slightly dilated internally, narrowest at the middle, and broader externally, with the anterior margin only slightly concave; tarsi very short; tarsal claws toothed or appendiculate.

The larvae, so far as known, are miners in the leaves of various plants, although very little is known about the biology of the species found in the tropical parts of the world. The adults are found feeding on the leaves of a great variety of plants, and are quite active during the warmer part of the day.

KEY TO THE GENERA.

- | | |
|---------------------------------------------------------------------|---------------------------|
| 1. Antennae lodged in a distinct deep groove in the prosternum..... | 2 |
| Antennae free in repose, not lodged in a groove in the prosternum. | |
| | <i>Trachys</i> Fabricius. |
| 2. Legs lodged in depressions beneath..... | 3 |
| Legs free..... | 5 |

3. Tibiæ flattened, outer margin sharp *Pachyschelus* Solier.
 Tibiæ cylindrical or subcylindrical, outer margin not sharp 4
4. Prosternal process deeply longitudinally grooved *Brachys* Solier.
 Prosternal process not longitudinally grooved *Lius* H. Deyrolle.
5. Prosternal process strongly constricted by the anterior coxal cavities ; agriliform.
Taphrocerus Solier.
 Prosternal process not constricted by the anterior coxal cavities ; form oblong or ovate 6
6. Metasternum deeply and narrowly arcuately emarginate ; prosternal process narrow, and narrowly rounded at apex ; body subcylindrical, strongly convex beneath *Callimicra* H. Deyrolle.
 Metasternum broadly arcuately emarginate ; prosternal process usually very broad, and broadly rounded at apex (in a few species it is rather narrow, and narrowly rounded at apex) ; body elliptical or oval, flattened or feebly convex beneath. . 7
7. Antennæ abruptly dentate from the sixth joint, outer joints triangular.
Leiopleura H. Deyrolle.
 Antennæ compact, gradually broader anteriorly, outer joints nearly square.
Leiopleurella Fisher.

The genera *Leiopleura* and *Callimicra* are very closely allied and some of the species have a tendency toward connecting the two genera. In the genus *Leiopleura* the species usually have the prosternal process very broad, broadly rounded at the apex, and the body strongly flattened beneath, but there are a few oblong species which approach the genus *Callimicra* by having the body more convex beneath, the prosternal process narrower, and more narrowly rounded at the apex, in which case the anterior margin of the metasternum is more deeply emarginate. In *Callimicra* the body is usually more subcylindrical, but in a few species it is more flattened and thus approaches the genus *Leiopleura*. In all of the species examined in this genus the prosternal process was narrow, and narrowly rounded at the apex, with the anterior margin of the metasternum deeply emarginate for the reception of the prosternal process.

In nearly all of the species the legs are lodged, more or less, in depressions on the underside of the body, but this character as used in the key applies only to the species which have the depressions very deep, and the upper surface of the legs, when in repose, is nearly on the same level as the remainder of the body.

Genus TRACHYS Fabricius.

Trachys FABRICIUS, Syst. Eleuth., vol. 2, 1801, p. 218.

This is a very large genus and contains about 350 described species. It is distributed throughout the entire world, with the exception of the Nearctic Region, which includes Canada, United States, and the northern half of Mexico. The species of this genus reach their highest development in the Indo-Malaysian Region, and so far only

7 species are known from America, 2 of which are described below. Besides the species mentioned in the key, the following have been described from South America: *estebana* Kerremans, from Venezuela; *chevrolati* Kerremans, from Guadeloupe Island; *boliviana* Kerremans, from Bolivia; and *amazonica* Kerremans, from the Amazon region of Brazil.

KEY TO THE SPECIES.

1. Above bicolored; head and pronotum piceus; elytra cyaneous.
 Above unicolored..... *cyanipennis* Fisher. 2
2. Above green, with a cyaneous tinge; front of head broadly depressed.
 Above aeneous; front of head not broadly depressed.... *concinna* Fisher.
 Above aeneous; front of head not broadly depressed.... *segregatus* Waterhouse.

TRACHYS SEGREGATUS Waterhouse.

Trachys segregatus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 131.

This bronzy species was described by Waterhouse from Guatemala, and was the first species of this genus to be described from the Western Hemisphere. It is said to be allied to the European *Trachys troglodytes* Schoenherr, from which it differs in being smaller and relatively narrower, elytra longer and more gradually narrowed to apex; head narrower without median groove; pronotum not quite as short, sides more distinctly margined, posterior angles less diverging, and the punctures smaller and very close together; elytra with humeral callus more distinct and glabrous, punctures smaller and moderately close together; and beneath with a few large, shallow punctures occupying the greater part of the surface. This species is not represented in the United States National Museum Collection, and is placed in the key from the characters given in the original description.

TRACHYS CYANIPENNIS, new species.

Elongate, rather strongly convex, broadly rounded in front, attenuate posteriorly, and slightly narrower behind than in front, glabrous and moderately shining; head, pronotum, and scutellum piceous, with a slight greenish reflection; elytra cyaneous, with a slight violaceous tinge; beneath piceous.

Head nearly flat, broadly and obsoletely depression on the front, the depression becoming obsolete on the occiput, and with a deep oblong depression behind the antennal cavities; surface irregularly and rather densely punctate, the punctures rather coarse on the occiput, but becoming obsolete anteriorly; intervals smooth; epistoma wide between the antennal cavities, the anterior margin deeply, arcuately emarginate; antennae rather short, with the first two joints bluish-black, and remainder of joints piceous. Pronotum slightly convex, nearly three times as wide as long, distinctly nar-

rower in front than behind, widest at the base; sides feebly arcuately attenuate from base to anterior angles, and narrowly margined; anterior angles rather acute; posterior angles rectangular; anterior margin broadly arcuately emarginate, with an obsolete lobe at middle; base transversely truncate to near middle of the elytron, then feebly sinuate and turning obliquely backward to the scutellum, in front of which it is truncate; surface without depressions, rather densely and irregularly punctate, the punctures rather shallow and well separated; intervals smooth. Scutellum very small, smooth, and triangular. Elytra moderately convex, slightly wider than pronotum at base; humeral angles obtusely angulated; sides parallel to the middle, then arcuately attenuate to the tips, which are conjointly narrowly rounded, with the lateral margins entire; each elytron with a broad, very shallow depression at the base, and a deep, elongate one behind the humerus along the lateral margin; surface without lateral carina, densely and coarsely punctate, the punctures deep and confluent at the base, but becoming finer and more widely separated toward the apex; intervals smooth. Abdomen beneath rather densely marked with shallow ocellate punctures, which are denser on the first segment and somewhat confluent at the sides; intervals obsoletely reticulate-striolate; last segment broadly rounded at apex. Prosternum sparsely and coarsely punctured; anterior margin broadly rounded; prosternal process rather narrow, slightly expanded behind the coxal cavities, and broadly rounded at apex.

Length, 2.5 mm.; width, 1.25 mm.

Type locality.—Porto Bello, Panama.

Type.—Cat. No. 25092, U.S.N.M.

Described from a single specimen collected by August Busck, March 3, 1911.

TRACHYS CONCINNA, new species.

Elongate, moderately convex, broadly rounded in front, attenuate posteriorly, and slightly narrower behind than in front, glabrous and strongly shining; head and pronotum green, the former strongly aeneous on the front; elytra green with a strong cyaneous tinge; beneath piceous.

Head nearly flat, rather deeply and broadly depressed on the front, with a rather deep round depression behind the antennal cavities; surface irregularly and coarsely punctate, the punctures widely separated, and becoming finer toward the epistoma; intervals smooth; epistoma wide between the antennae, the anterior margin deeply, arcuately emarginate; antennae rather short and entirely piceous. Pronotum slightly convex, two and one-half times as wide as long, distinctly narrower in front than behind, widest at the base; sides obliquely attenuate from base to anterior angles, and narrowly margined; anterior angles rather acute; posterior angles rectangular;

anterior margin broadly arcuately emarginate, with an obsolete lobe at middle; base transversely truncate to near middle of the elytron, then feebly sinuate and turning obliquely backward to the scutellum, in front of which it is narrowly rounded; surface with a broad, shallow depression near the posterior angles, irregularly and coarsely punctured, similar to that of the head; intervals smooth. Scutellum obsolete, punctiform. Elytra moderately convex, slightly wider than pronotum at base; humeral angles broadly rounded; sides parallel to behind the middle (rather strongly sinuate at basal third), then arcuately attenuate to the tips, which are conjointly narrowly rounded, with the lateral margins entire; each elytron with a broad, rather deep depression at the base, and a similar one behind the humerus, close to the lateral margin; surface without lateral carina, rather densely and irregularly punctate, the punctures very coarse at the base, becoming obsolete at the apex, and with a tendency of forming striae on the disk, between which is a series of smaller punctures; intervals smooth. Abdomen beneath coarsely and rather sparsely punctate, the punctures shallow and open on the one side, and becoming striolate at the sides of the first segment; intervals finely and densely reticulate-striolate; last segment broadly rounded at apex. Prosternum coarsely and sparsely punctured; anterior margin broadly rounded; prosternal process broad, slightly expanded behind the coxal cavities, and broadly rounded at apex.

Length, 3.25 mm.; width, 1.75 mm.

Type locality.—Turrialba, Costa Rica.

Type.—Cat. No. 25093, U.S.N.M.

Described from a single specimen collected by Messrs. Schild and Burgdorf.

In dissecting a number of specimens of various species in this genus, I find that it is the females that have the apical part of the abdomen armed with a series of small teeth, and not the males, as recorded by Waterhouse. Since he has used this character in the description of the males of his new species, the sexes should be reversed in all his descriptions in this genus. The males in this genus have the last abdominal segment entire, and sometimes produced into a short, acute spine at the apex.

Genus *PACHYSCHELUS* Solier.

Pachyschelus SOLIER, Ann. Soc. Ent. France, ser. 1, vol. 2, 1833, p. 313.

This is a very large genus and contains about 164 species, 16 of which are described as new in the present paper. This genus has a rather wide distribution, and reaches its highest development in South America, from where the type species of the genus was described. Of this large number of species, 7 have been described from the Indo-Malaysian Region, 2 from Madagascar, 1 from Africa, 5

from the United States, 62 from Mexico and Central America, and the remainder from South America.

Pachyschelus cyaneus (Gory), described from Brazil¹ and recorded by Waterhouse,² from Teapa, Mexico; San Juan and El Tunador, Guatemala; Taboga Island, Panama; and Cayenne, Guiana, and also *Pachyschelus robustus* described by Waterhouse from San Geronimo, Guatemala,³ have been omitted from the key, as it has been impossible to correlate the characters given in the original descriptions with those used in the key.

Mr. Waterhouse states⁴ "that the structure of the apex of the abdomen of the males appears to afford good specific characters, and finds that the arrangement and form of the teeth are constant." Throughout the genus he uses this character in describing the males, and on plate 8 figures the terminal part of the abdomen of the males of 24 species. Nicolay and Weiss in their paper on The Genera *Pachyschelus* and *Taphrocerus*⁵ have followed Waterhouse in the use of this sexual character as applied to the males.

KEY TO THE SPECIES.

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1. Elytra distinctly pubescent, or with pubescent spots..... | 2 |
| Elytra glabrous, or with only a few obsolete hairs arising from the punctures.. | 29 |
| 2. Broadly ovate species..... | 3 |
| Oblong species..... | 8 |
| 3. Regularly oval..... | 4 |
| Not regularly oval, more acuminate posteriorly..... | 6 |
| 4. Elytra cupreous or aeneous, with a purplish or greenish tinge, rather densely pubescent, with a small dark lunate spot on disk, and a less distinct, broadly arcuate one at apical third..... | <i>rotundipennis</i> Fisher. |
| Elytra black..... | 5 |
| 5. Elytra with a violaceous or bluish-green tinge, and sparsely pubescent, the pubescence arranged in irregular longitudinal rows..... | <i>atroviridis</i> Fisher. |
| Elytra densely clothed with cinereous pubescence, except a large lunate spot (common to both elytron), where the pubescence is black.. | <i>lunifer</i> Waterhouse. |
| 6. Surface above bicolored; head and pronotum aureous; elytra violaceous, and very sparsely, irregularly pubescent..... | <i>festivus</i> Fisher. |
| Surface above unicolored..... | 7 |
| 7. Elytra black, with a slight coppery-purple tinge along sides, shining and clothed with cinereous pubescence, except for a large round spot, common to both elytron..... | <i>cinctus</i> Waterhouse. |
| Elytra black, with lateral margins narrowly violaceous, subopaque, and rather densely clothed with cinereous pubescence, the pubescence forming irregular designs..... | <i>pilosus</i> Fisher. |
| 8. Elytra attenuate from base to apex..... | 9 |
| Elytra with sides parallel to basal third, or slightly wider at middle of elytra than at base, then attenuate to the apex..... | 15 |

¹Mon. Bupr. Suppl., vol. 4, 1841, p. 344, pl. 53, fig. 340.

²Biol. Centr.-Amer., Coleopt., vol. 3, pt. 1, 1889, p. 145.

³Idem, pp. 142-143.

⁴Idem, p. 137.

⁵Journ. N. Y. Ent. Soc., vol. 28, 1920, pp. 137-142.

9. Regularly oblong; sides of elytra arcuately attenuate from base to apex..... 10
 Trapeziformis or subtrapeziformis; sides of elytra obliquely attenuate from base to apex 11
10. Above aeneous, with a slight brownish tinge on the elytra; sparsely pubescent, the pubescence not forming any distinct designs *irroratus* Waterhouse.
 Above black, with a violet-carmine reflection; elytra sparsely clothed with isolated whitish hairs *carmineus* Kerremans.
11. Surface above aeneous or cupreous, with a brownish tinge..... 12
 Surface above piceous..... 13
12. Elytron with the sutural angles distinctly produced .. *trapezoidalis* Waterhouse.
 Elytron with the sutural angles not produced..... *signatus* Waterhouse.
13. Surface above piceous, with a strong violaceous tinge 14
 Surface above piceous, without any violaceous tinge.... *albopictus* Kerremans.
14. Elytra with the apex subtruncate; surface densely punctured, and somewhat opaque..... *mexicanus* Fisher.
 Elytra with the apex broadly rounded; surface sparsely punctured and shining. *jenningsi* Fisher.
15. Surface above bicolored..... 16
 Surface above unicolored..... 21
16. Pronotum aeneous..... 17
 Pronotum black, bluish-green, or coppery-brown..... 18
17. Elytra violaceous, with one transverse pubescent fascia.. *pubicollis* Waterhouse.
 Elytra violaceous, with two transverse pubescent fasciae... *cuneiformis* Fisher.
18. Pronotum coppery-brown; elytra purplish, with a distinct pubescent fascia behind middle, which appears almost to cover the apex; form nearly as narrow in front as behind..... *laticeps* Waterhouse.
 Pronotum black or bluish-green..... 19
19. Pronotum bluish-green; elytra dark blue, with violet or purplish tints at base and sides, and with two undulating pubescent fasciae, one behind the middle and the other near the apex..... *bifasciatus* Waterhouse.
 Pronotum black..... 20
20. Elytra purplish, very sparsely pubescent, the pubescence arising from the punctures and arranged in longitudinal rows; pronotum black, with the lateral margins greenish..... *purpureipennis* Waterhouse.
 Elytra dark blue, the cinereous pubescence forming small patches on the middle of disk near the apex; pronotum entirely black..... *bicolor* Kerremans.
21. Sides of elytra slightly wider at middle than base, dark cupreous, with a purplish tinge, with a little whitish pubescence near scutellum, a small spot near the suture about the middle, and a distinct curved fascia, commencing at the margin behind the middle, and descending to the apical third at the suture. *elegans* Waterhouse.
 Sides of elytra parallel to near the middle..... 22
22. Surface above piceous..... 23
 Surface above blue, green, or aeneous 24
23. Elytra deeply depressed at base; surface strongly violaceous, and ornated with cinereous pubescence as follows: An irregular area behind scutellum, a transverse undulating fascia at middle, and a narrow undulating one at the apical fourth..... *albofasciatus* Fisher.
 Elytra not deeply depressed at base; surface feebly bluish or violaceous, and ornated with cinereous pubescence as follows: A narrow transverse fascia at middle, and a narrow undulating one at the apical third.... *atrifrons* Fisher.
24. Surface above blue or green..... 25
 Surface above dark aeneous; each elytron ornated with yellowish pubescence as follows: An elongate area behind the scutellum, a narrow fascia extending

- from the humerus obliquely backward toward the suture, a transverse undulating fascia at middle, a similar one just behind the middle, and an obsolete transverse one at the apex..... *sulcifrons* Fisher.
25. Surface above bottle green; elytra with a narrow transverse fascia of cinereous pubescence at apical third..... *unifasciatus* Fisher.
Surface above blue..... 26
26. Elytra with only one pubescent fascia..... 27
Elytra with more than one pubescent fascia..... 28
27. Each elytron with a narrow, slightly oblique fascia of white pubescence at apical fourth, reaching from the lateral margin to near the suture; female with last abdominal segment armed with four short triangular teeth, arranged in a curve on each side of a moderately wide triangular notch.... *biguttatus* Waterhouse.
Each elytron with a slightly wider oblique fascia at apical fourth, which is more distant from the suture than in *biguttatus*; last abdominal segment of female broad at apex, only slightly curved, and with eight subequal teeth, the middle pair a little more separated than the others..... *sticticus* Waterhouse.
28. Each elytron with a white spot close to the scutellum, a fascia commencing at the lateral angulation descends slightly to about the middle of the elytron, then ascends obliquely, and, turning over, descends to the suture; and a distinct anteapical fascia, which is transverse at sides, then ascends obliquely a very short distance, then descends to the suture..... *undulatus* Waterhouse.
Each elytron with an oblique pubescent fascia at apical fourth, reaching from the lateral margin to near the suture, and with a few white spots on the disk at middle..... *azureus* Waterhouse.
29. Broadly ovate species..... 30
Oblong species..... 40
30. Regularly ovate..... 31
Not regularly ovate, more acuminate posteriorly..... 38
31. Surface above unicolorous..... 32
Surface above bicolorous..... 34
32. Strongly convex above; surface above entirely black and shining.
hydroporoides Waterhouse.
Moderately convex above; surface above subopaque; head and pronotum densely punctured; elytra more rugose, and closely strigose near the base..... 33
33. Surface above dark green, with very short obsolete hairs; scutellum with a feeble piceous tinge..... *obsoletopilosus* Fisher.
Surface above brunneo-aeneous..... *centralis* Waterhouse.
34. Strongly convex above..... 35
Moderately convex above..... 36
35. Pronotum bluish-green; elytra blue..... *ovalis* Waterhouse.
Pronotum cupreous, with a golden tinge; elytra bluish-green, with the base tinted purple..... *astraeus* Waterhouse.
36. Pronotum cupreous; elytra coppery-red, with a broad bluish-purple margin.
discoidalis Waterhouse.
Pronotum bluish-black, sometimes with the margins tinted purple..... 37
37. Elytra dark blue, with a slight purplish tinge at margins; pronotum densely punctured..... *modestus* Waterhouse.
Elytra purplish-blue, more strongly depressed above; pronotum sparsely punctured..... *aversus* Waterhouse.
38. Scutellum two times as wide as long, anterior angles rectangular; surface above subopaque..... *subopacus* Fisher.
Scutellum not two times as wide as long, anterior angles acute; surface above shining..... 39

39. Sides of elytra angulated at middle; pronotum piceous, with the sides narrowly margined with dull green; elytra violaceous..... *nigricollis* Waterhouse.
Sides of elytra not angulated at middle; color very variable.
compactus Waterhouse.
40. Above strongly depressed..... 41
Above moderately convex..... 42
41. Head and pronotum pale green; scutellum piceous; elytra violaceous; beneath piceous; female with last abdominal segment strongly produced at apex, with a deep V-shaped incision at middle, and with one broad and three very sharp teeth on each side..... *chapuisi* (Dugès).
Head, pronotum, and scutellum pale green; elytra caeruleus; beneath dark green; female with last abdominal segment not strongly produced, slightly arcuate at apex, with eight teeth, the outer tooth at each end of the series is acute and the apex pointed outwards, the other six teeth are broad and nearly truncate..... *deplanatus* (Chevrolat).
42. Elytra arcuately attenuate from base to apex..... 43
Elytra not arcuately attenuate from base to apex..... 44
43. Surface above uniformly piceous, with a feeble violaceous reflection.
unicolor Fisher.
Surface above bicolored; head and pronotum golden-green, the latter with the median part cupreous; elytra cyaneous or purplish..... *ardens* Waterhouse.
44. Elytra a little wider at basal fourth than at base..... 45
Elytra with sides parallel to apical third, and rather strongly angulated near middle..... 55
45. Surface above uniformly cyaneous..... *affinis* Waterhouse.
Surface above bicolored..... 46
46. Elytra bicolored..... 47
Elytra unicolored..... 48
47. Elytra coppery-red, with the disk fuscous..... *granulosicollis* Waterhouse.
Elytra cyaneous, with the apical third bright coppery-red, the coppery area margined anteriorly with a strong violaceous color..... *cupricauda* Fisher.
48. Pronotum unicolored..... 49
Pronotum bicolored..... 52
49. Pronotum golden-green or aeneous..... 50
Pronotum uniformly black with an aeneous tinge..... 51
50. Pronotum golden-green; elytra coppery-red..... *fulgens* Waterhouse.
Pronotum aeneous; elytra dark bluish-green..... *constans* Waterhouse.
51. Elytra purple; female with the last abdominal segment narrowly rounded at apex, with a deep V-shaped incision at middle, and four nearly equidistant teeth on each side, arranged in a curve, the central pair is a little larger (not longer) than the outer ones..... *purpureipennis* Waterhouse.
Elytra piceous, with a strong bluish-green and violaceous tinge; female with the last abdominal segment narrow and strongly produced at apex, deeply, narrowly, and arcuately emarginate at middle, with a very strong tooth on each side of it, next to which is a shorter tooth, and on the outside, a very small acute tooth at a lower level..... *panamensis* female Fisher.
52. Elytra cyaneous..... 53
Elytra piceous, with a strong bluish-green and violaceous tinge; pronotum piceous, with the sides aeneous..... *panamensis* male Fisher.
53. Disk of pronotum black or fuscous..... 54
Disk of pronotum golden-green, with the sides cyaneous; elytra cyaneous; last abdominal segment of female with a small triangular notch in middle, a broad, angularly emarginate process on each side, and a small acute tooth on the outside at a lower level..... *dubius* Waterhouse.

54. Pronotum with the sides dark green..... *cyanellus* male (Castelnau and Gory).
Pronotum with the sides pale bluish-green..... *diversus* Waterhouse.
55. Pronotum unicolored..... 56
Pronotum bicolored..... 57
56. Pronotum black; elytra dark green..... *solitarius* Kerremans.
Pronotum coppery-red or aeneous; elytra cyaneous... *thoracicus* Waterhouse.
57. Disk of pronotum cyaneous, with an aeneous tinge, sides cupreo-aureis; elytra purple..... *incertus* Waterhouse.
Disk of pronotum black or fuscous; sides aeneous or greenish..... 58
58. Elytra violaceous or purplish; last abdominal segment of female arcuately emarginate at middle, with three very short teeth placed obliquely on each side, the outer tooth rather smaller than the others..... *familiaris* Waterhouse.
Elytra cyaneous..... 59
59. Front of head when viewed from above arcuately rounded; last abdominal segment of female with three nearly equal acute teeth placed obliquely on each side; the two sets of teeth separated by a rather wide arcuate emargination..... *communis* Waterhouse.
Front of head when viewed from above feebly emarginate..... 60
60. Pronotum with the sides broadly margined with a bright aeneous color, the black area extending over one-third of the surface; female with the last abdominal segment narrow at apex; and with eight acute equidistant teeth arranged in a curve, the central pair being a little smaller than the outer ones..... *octodentatus* Waterhouse.
Pronotum with the sides narrowly margined with an aeneous or greenish color, the black area extending over more than one-third of the surface; last abdominal segment of female produced and truncate at apex, with a slight notch in the middle, and with two very small teeth close together at the outer angle of the truncature..... *secedens* Waterhouse.

PACHYSCHELUS ROTUNDIPENNIS, new species.

Male.—Broadly ovate, slightly longer than wide, broadly rounded in front, slightly narrower behind than in front, moderately shining; head and lateral margins of pronotum auro-cupreous; disk of pronotum, scutellum, and elytra dark cupreous; surface rather densely clothed with short recumbent cinereous hairs, and with a dark lunate area on disk of elytra; beneath piceous.

Head flat and deeply embedded in the prothorax, with an obsolete median depression on the front; surface shining and densely punctate, the punctures large and well separated, densely clothed over entire surface with rather long, recumbent, cinereous hairs; intervals finely, densely granulated anteriorly, becoming smoother on the occiput. Pronotum moderately convex, about four times as wide as long at middle, distinctly narrower in front than behind, widest at the basal third; sides arcuate from base to basal third, then strongly, obliquely arcuate to the anterior angles, which are broadly rounded; anterior margin deeply, arcuately emarginate for the insertion of the head; base feebly obliquely truncate to the elytral lobe, where it is acutely, arcuately emarginate, then transversely truncate in front of scutellum; hind angles obtuse, not projecting beyond the humeral angles of the elytra; surface broadly, obsoletely depressed toward the sides,

densely punctate, the punctures large, very shallow and open on one side, becoming finer on the disk, densely clothed over entire surface with rather long, recumbent, cinereous hairs; intervals finely and densely granulated at the sides, the granulation becoming more obsolete on the disk. Scutellum smooth and glabrous, with the anterior angles acute. Elytra as wide as pronotum at base, widest at basal fourth; humeral angles obtuse; sides broadly rounded to middle, then arcuately attenuate to the tips, which are conjointly broadly rounded, the lateral margin being entire and when viewed from the side is broadly and deeply arcuate at the middle; surface with a broad, shallow depression at the base, a deeper one extending from the humeral angle obliquely backward to the middle, and connected to a narrow depression along the lateral margin extending to near the tip, causing a round gibbosity behind the middle, which is slightly closer to the lateral margin than to the suture, finely, densely punctate over entire surface, and rather densely clothed with short, recumbent, cinereous hairs, except a small lunate spot a short distance behind the scutellum (common to both elytron), where the pubescence is black; there is also an obsolete dark area extending obliquely backward from the humeri, and a broadly arcuate one at the apical third, caused by the cinereous pubescence being sparser and allowing the surface color to become more prominent. Abdomen beneath flat, sparsely and coarsely punctate, the punctures shallow and open on the one side, from each puncture arising a rather long, recumbent, cinereous hair; intervals finely and densely reticulate; last segment very broadly rounded at apex. Elytral epipleura broad and rather deeply concave. Metasternum more coarsely punctured than abdomen, and truncate in front. Prosternum short, very deeply emarginated for the insertion of the head; prosternal process rather narrow, about two times as wide as the coxal cavities, sides nearly parallel, and the apex broadly rounded; prothoracic episternum parallel, long, very narrow, and deeply concave. Prothoracic epipleura very wide, and moderately concave; antennal grooves deep, nearly transverse, and reaching to the lateral margin slightly in front of the middle; lateral margin acute.

Female.—Differs from the male in having the head and pronotum entirely dark cupreous, and the last abdominal segment very broadly rounded, almost truncate, with the angles broadly rounded, and furnished with about 26 short, blunt teeth, one or two at the extremities of the series being smaller and not so well defined as the others, the portion in front of the marginal groove with a row of large teeth at the tip, and a transverse series of very long yellowish hairs at middle of segment.

Length, 3.2 mm.; width, 3 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type, allotype, and paratypes.—Cat. No. 25094, U.S.N.M.

Described from six specimens, three males and three females, all collected at Paraiso, Canal Zone, Panama, by August Busck and E. A. Schwarz during February, March, and April, 1911. The elytra of three of the paratypes are of a greenish-bronze color instead of dark cupreous as in the type; otherwise they are identical.

This is a very rotund species, and superficially resembles some of the Coccinellidae. It is closely allied to *lunifer* Waterhouse, described from Guatemala, but is of a cupreous or greenish-bronze color above, and with a dark arcuate area near the apex. The terminal segment of the abdomen of the female is quite different from *lunifer*, but resembles more closely that of *laticeps*, described by Waterhouse from Panama, although differing in other respects from that species.

PACHYSHELUS ATROVIRIDIS, new species.

Male.—Broadly ovate, slightly longer than wide, slightly narrower behind than in front, shining, black, with a violaceous and bluish-green tinge; surface sparsely pubescent; beneath piceous.

Head flat and rather deeply embedded in the prothorax, with an obsolete median depression on the occiput; surface rather densely, coarsely punctate and densely, obsoletely granulated. Pronotum moderately convex, about three times as wide as long at middle, much narrower in front than behind, widest at base; sides strongly obliquely arcuate from base to apical angles, which are nearly rectangular; anterior margin broadly, arcuately emarginate; base feebly, obliquely truncate to the elytral lobe, where it is acutely, arcuately emarginate, then transversely truncate in front of scutellum; hind angles nearly rectangular, not projecting beyond the humeral angles of the elytra and fitting closely to them; surface feebly depressed near the posterior angles, sides densely, finely granulated and sparsely punctate, the punctures large, shallow, and open on one side, becoming obsolete on the disk, very sparsely clothed with short, inconspicuous cinereous hairs. Scutellum obsoletely granulated, and glabrous, with the anterior angles acutely rounded. Elytra as wide as pronotum at base, widest at the middle; humeral angles obtuse; sides broadly arcuate, more attenuate posteriorly to the tips, which are rather broadly, conjointly rounded, the lateral margin entire, and when viewed from the side is broadly arcuate from humeral angle to the apex; each elytron with a rather broad, shallow depression at the base, and a deeper one between the humerus and lateral margin, extending along margin from the humeral angle to the middle; surface sparsely and rather coarsely punctate, sparsely clothed with irregular patches of recumbent cinereous pubescence, which is arranged longitudinally, and each elytron with a broader, conspicuous spot at the middle a short distance from the suture. Abdomen beneath slightly

convex, sparsely and obsoletely punctate, the punctures very shallow and usually open on the one side, clothed with a few inconspicuous recumbent hairs; intervals very finely and obsoletely reticulate; last segment rather acutely rounded at apex. Elytral epipleura narrow. Metasternum more coarsely punctured than the abdomen, and rather deeply, arcuately emarginate in front. Prosternum rather broadly emarginate in front; prosternal process rather narrow, a little more than two times as wide as the coxal cavities, sides nearly parallel, and the apex broadly rounded; prothoracic episternum nearly parallel, long, very narrow, and nearly flat. Prothoracic epipleura wide and nearly flat, except for a shallow longitudinal depression behind the antennal groove; lateral margin nearly rectangular; antennal groove deep and extending to the lateral margin near the middle, and parallel to the tibial groove.

Length, 2.5 mm.; width, 1.8 mm.

Type locality.—Lion Hill, Canal Zone, Panama.

Type.—Cat. No. 25095, U.S.N.M.

Described from a unique male collected by August Busek, June 18, 1907.

This is a short ovate species allied to *cinctus* Waterhouse, but can be distinguished from that species by being sparsely pubescent, and the pubescence on elytra arranged longitudinally.

PACHYSCHELUS LUNIFER Waterhouse.

Pachyschelus lunifer WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 148-149, pl. 7, figs. 22, 22a.

This species was described from material collected by Mr. Champion, at Volcan de Atitlan, Guatemala, at an altitude of 3,000 feet. The type is in the British Museum and has not been examined. The species is placed in the key from the characters given in the original description.

PACHYSCHELUS FESTIVUS, new species.

Male.—Broadly ovate, slightly longer than wide, more strongly narrowed behind than in front, shining; head and pronotum bright aureous; scutellum and elytra cyaneous, becoming violaceous toward the margins; surface sparsely pubescent; beneath piceous.

Head flat, feebly longitudinally and rather broadly grooved from vertex to epistoma; surface shining, with a few large, shallow, distant punctures, and very sparsely clothed with obsolete cinereous hairs. Pronotum moderately convex, three and one-half times as wide as long at middle, much narrower in front than behind, widest at base; sides strongly, obliquely arcuate from base to apical angles, which are nearly rectangular; anterior margin broadly, arcuately emarginate; base obliquely truncate to the elytral lobe, where it is rather

broadly arcuately emarginate, then transversely truncate in front of scutellum; hind angles obtuse, not projecting beyond the humeral angles of the elytra and fitting closely to them; surface broadly, obsoletely depressed toward the sides, and with two small round depressions on the disk, sides sparsely punctate, the punctures large and very shallow, becoming nearly obsolete on the disk, very sparsely clothed with short inconspicuous cinereous hairs. Scutellum obsoletely granulated and glabrous, with the anterior angles rather broadly rounded. Elytra as wide as pronotum at base, widest at basal fourth; humeral angles obtuse; sides broadly arcuate, more attenuate posteriorly to the tips, which are conjointly rounded, the lateral margin entire, and when viewed from the side, is broadly arcuate from humeral angle to the apex; each elytron with a rather broad, shallow depression at the base, and a deeper one between the humerus and lateral margin, extending along the margin from the humeral angle to middle, and becoming broader behind the humerus; surface rather densely, coarsely punctate and sparsely clothed with recumbent cinereous pubescence, forming an indistinct transverse fascia at middle and sparsely covering the apical fourth. Abdomen beneath slightly convex, sparsely and obsoletely punctate, the punctures very shallow and usually open on the one side, sparsely clothed with inconspicuous recumbent hairs; intervals finely and obsoletely reticulate; last segment rather acutely rounded at apex. Elytral epipleura narrow. Metasternum more coarsely punctured than the abdomen, and rather deeply arcuately emarginate in front. Prosternum nearly truncate in front; prosternal process rather narrow, a little more than two times as wide as the coxal cavities, sides slightly expanded behind the coxal cavities, with the apex broadly rounded; episternum nearly parallel, long, very narrow, and slightly concave. Prothoracic epipleura wide and nearly flat, except for a shallow longitudinal groove behind the antennal groove; lateral margin nearly rectangular; antennal groove very deep and extending to the lateral margin near the middle, and parallel to the tibial groove.

Length, 2.4 mm.; width, 1.7 mm.

Type locality.—Panama City, Panama.

Type.—Cat. No. 25096, U.S.N.M.

Described from a unique male collected by A. H. Jennings, April 12, 1911.

In form and color this species resembles the variety of *compactus* Waterhouse with the cupreous head and pronotum, but it is more robust than that species, and also differs from it in being sparsely pubescent, the pubescence forming indistinct transverse fascia on the elytra.

PACHYSCHELUS CINCTUS Waterhouse.

Pachyschelus cinctus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 149, pl. 8, fig. 15.

This species was described from material collected by Mr. Champion, at Rio Maria Linda, Guatemala, at an elevation of 500 feet, and also from Volcan de Chiriqui, Panama, at an altitude of 2,000 to 4,000 feet, without designating any definite type locality. No specimens of this species have been examined, and it is placed in the key solely upon the characters given in the original description.

PACHYSCHELUS PILOSUS, new species.

Female.—Broadly ovate, slightly longer than wide, more strongly narrowed behind than in front, subopaque, piceous, with the elytra narrowly violaceous along lateral margins; surface rather densely pubescent, the pubescence forming irregular designs on the elytra; beneath piceous, more shining than above.

Head flat and deeply embedded in the prothorax, with an obsolete median depression on the vertex: surface rather densely punctate, the punctures large, shallow, and well separated, sparsely clothed with rather short cinereous hairs on the occiput; intervals finely, densely granulated. Pronotum moderately convex, nearly four times as wide as long at the middle, much narrower in front than behind, widest at base; sides strongly, obliquely arcuate from base to apical angles, and narrowly margined; apical angles nearly rectangular; anterior margin deeply, arcuately emarginate for the insertion of the head; base feebly, obliquely truncate to the elytral lobe, where it is acutely, arcuately emarginate, then transversely truncate in front of scutellum; hind angles obtuse, not projecting beyond the humeral angles of the elytra and fitting closely to them; surface feebly depressed at base, finely, densely granulated over entire surface, sparsely clothed with short, recumbent black and cinereous pubescence forming irregular designs. Scutellum obsoletely punctured, and glabrous, with the anterior angles acute. Elytra as wide as pronotum at base; widest at basal fourth; humeral angles obtuse; sides broadly arcuate, rather strongly attenuate posteriorly to the tips, which are conjointly rounded, the lateral margin very feebly serrate, and when viewed from the side, is broadly arcuate from humeral angle to apex and feebly sinuate just behind the middle; each elytron with a broad, shallow depression at the base, and a deeper one between the humerus and lateral margin, extending along the margin from the humeral angle to the middle, and becoming much broader and deeper behind the humerus; surface finely, densely punctate, becoming somewhat rugose toward the sides, and sparsely, irregularly clothed with rather short recumbent cinereous and black pubescence, the black pubescence on each elytron forming an obsolete, broken, transverse fascia

at basal third, a longitudinal one joined to the transverse band at middle and extending arcuately to the suture at the apical third, and a more obsolete arcuate one at the apical fourth. Abdomen beneath rather convex, coarsely and rather sparsely punctate, the punctures very shallow and open on the one side, sparsely clothed with short inconspicuous hairs; intervals finely and obsoletely reticulate; last segment broadly rounded at apex, with 14 rather long, moderately broad, equal teeth, which are rounded at apex, placed close together and bent downward at right angles to the abdomen. Elytral epipleura narrow. Metasternum more coarsely punctured than the abdomen, and rather broadly arcuately emarginate in front. Prosternum rather deeply, arcuately emarginate in front; prosternal process rather broad, three times as wide as the coxal cavities, sides nearly parallel, and the apex broadly rounded; episternum long, flat, and triangular, strongly attenuate anteriorly. Prothoracic epipleura wide and nearly flat, feebly, longitudinally concave behind the antennal groove, which is very deep and extending to the lateral margin near the middle, and parallel to the tibial groove; lateral margin rather acute posteriorly, and nearly rectangular in front of the antennal groove.

Length, 3 mm.; width, 2.25 mm.

Type locality.—Porto Bello, Panama.

Type and paratypes.—Cat. No. 25097, U.S.N.M.

Described from three females, all collected by E. A. Schwarz; two of these collected at Porto Bello, Panama, February 26, 1911, and the other one at Paraiso, Canal Zone, Panama, on March 15, 1911.

PACHYSHELUS IRRORATUS Waterhouse.

Pachyschelus irroratus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 149, pl. 7, figs. 23, 23a.

Described from material collected by Mr. Höge at Mazatlan in Sinaloa, Mexico. It is represented in the National Museum Collection by two specimens collected at Izamal, Yucatan, Mexico, during April, by C. H. T. Townsend, which agree very well with the description.

PACHYSHELUS CARMINEUS Kerremans.

Pachyschelus carmineus KERREMANS, Ann. Soc. Ent. France, vol. 63, 1894, pp. 420-421.

Described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. The origin of the specimens collected under these conditions should be verified, as tobacco from Brazil, Mexico, and other localities was stored in the same building. The species is unknown to the writer and is placed in the key from the characters given in the original description.

PACHYSCHELUS TRAPEZOIDALIS Waterhouse.

Pachyschelus trapezoidalis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 151, pl. 7, figs. 24, 24a.

Described from material collected by H. H. Smith, at Chilpancingo in Guerrero, Mexico, at an altitude of 4,600 feet. Mr. Waterhouse also records a specimen from Yolos, Mexico, which differs slightly from the type in having the pubescence more distinctly sandy yellow. The species has been placed in the key from the characters given in the original description.

PACHYSCHELUS SIGNATUS Waterhouse.

Pachyschelus signatus WATERHOUSE Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 150, pl. 8, fig. 17.

The type locality for this species is Cahabon, Guatemala, and was described from material collected by Mr. Champion. It is also recorded from Chiacam and San Juan in Vera Paz, Guatemala, from material taken by the same collector. It is not represented in the National Museum Collection and has been given its position in the key from the characters given in the original description.

PACHYSCHELUS ALBOPICTUS Kerremans.

Pachyschelus albopictus KERREMANS, Ann. Soc. Ent. France, vol. 63, 1894, p. 421.

This species was described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. The species is unknown to the writer, and has been placed in the key solely upon the characters given in the original description.

PACHYSCHELUS MEXICANUS, new species.

Female.—Subtrapeziformis, distinctly longer than wide, strongly narrowed posteriorly, subopaque, piceous, with a violaceous tinge toward the lateral margins; surface moderately pubescent, the pubescence forming irregular designs on the basal half of elytra, and a more distinct transverse undulating fascia at apical third; beneath piceous.

Head feebly convex and deeply embedded in the prothorax, rather feebly, longitudinally grooved from vertex to epistoma, the groove becoming deeper anteriorly; surface with a few large, shallow, obsolete punctures, and sparsely clothed posteriorly with short cinereous hairs. Pronotum feebly convex, nearly four and one-half times as wide as long at middle, much narrower in front than behind, widest at base; sides attenuate from base to apical fourth, then broadly arcuate to the apical angles, which are rectangular; anterior margin deeply, arcuately emarginate for the insertion of the head; base nearly truncate, slightly sinuate at the elytral lobes; hind angles acute, projecting slightly beyond the humeral angles of the elytra and fitting

closely to them; surface at sides rather densely punctate, the punctures large, shallow, and open on one side, and becoming obsolete on the disk, sparsely, irregularly clothed with rather long, recumbent, cinereous hairs. Scutellum smooth and glabrous, with the anterior angles acute. Elytra as wide as pronotum at base; humeral angles broadly rounded; sides obliquely attenuate to near the tips, which are broadly subtruncate, the lateral margin feebly serrate, and when viewed from the side is nearly straight, except for an abrupt sinuation for the posterior femora; each elytron with a broad, shallow depression at the base, and a very narrow, deep one between the humerus and lateral margin, extending along margin from the humeral angle to the sinuation in lateral margin, the depression becoming broadly rounded behind the humerus; surface densely, finely punctate, becoming feebly rugose toward the sides, and sparsely, irregularly clothed with rather long, recumbent, cinereous hairs and a few black erect ones intermixed, the white hairs forming irregular designs on the basal half, and a distinct, undulating fascia at apical third; commencing at the margin it is very slightly directed downward, then slightly farther upward, and then, again descending to the suture, there is also an obscure transverse fascia near the apex. Abdomen beneath strongly convex, coarsely and rather sparsely punctate, the punctures very shallow and open on the one side, sparsely clothed with short, recumbent, cinereous hairs; intervals obsoletely reticulate; last segment finely transversely rugose, rather narrowly produced, bent obliquely downward, and deeply, widely arcuately emarginate at apex, with two sharp teeth of equal length on each side of the emargination and two very small acute teeth on the outer side at a much lower level, the portion in front of the marginal groove rather acutely rounded at apex, with a rather deep, narrow, longitudinal groove, extending from the apex to the middle of the segment, the groove with a large puncture at the middle, and bordered on both sides by a series of rather long yellowish hairs. Elytral epipleura narrow. Metasternum more coarsely and deeply punctured than the abdomen, and rather deeply and broadly, arcuately emarginate in front. Prosternum feebly arcuately emarginate anteriorly; prosternal process three times as wide as the coxal cavities, sides slightly expanded behind the coxae, and the apex very broadly rounded; episternum flat, somewhat rectangular, but more attenuate laterally. Prothoracic epipleura wide and nearly flat, with a deep narrow groove behind the antennal groove; lateral margin rectangular, becoming more acute posteriorly; antennal groove deep, following the suture between the episternum and epipleura, extending into the latter to about the middle, and parallel to the tibial groove.

Length, 2.75 mm.; width, 1.75 mm.

Type locality.—Tampico, Mexico.

Type.—Cat. No. 2509S, U.S.N.M.

Described from a single female collected by E. A. Schwarz on December 21, 1909.

PACHYSCHELUS JENNINGSI, new species.

Male.—Subtrapeziformis, considerably longer than wide, strongly narrowed posteriorly, shining, piceous, with a strong violaceous tinge; surface moderately pubescent, the pubescence forming irregular transverse undulating fasciae on the elytra; beneath piceous.

Head moderately convex, longitudinally grooved from occiput to epistoma, the groove deep on the vertex and front, becoming feebly defined on the occiput; surface very sparsely, obsolete punctate, and feebly granulated near the epistoma, and sparsely clothed posteriorly with rather long, recumbent cinereous hairs. Pronotum moderately convex, nearly three and one half times as wide as long at middle, much narrower in front than behind, widest at base; sides strongly, obliquely arcuate from base to apical angles, which are nearly rectangular; anterior margin deeply, arcuately emarginate; base nearly truncate, slightly sinuate at the elytral lobes; hind angles acute, projecting slightly beyond the humeral angles of the elytra and not fitting closely to them; surface sparsely punctate and finely, densely granulated along lateral margin, the punctures becoming very fine and nearly obsolete on the disk, sparsely and irregularly clothed with rather long, recumbent, cinereous hairs. Scutellum smooth and glabrous, with the anterior angles acute. Elytra as wide as pronotum at base; humeral angles obtusely rounded; sides obliquely attenuate to near the tips, which are conjointly rounded, there is also a feeble sinuation at apical third, the lateral margin is strongly serrate and, when viewed from the side, is nearly straight, except for an abrupt sinuation for the posterior femora; each elytron with a broad, shallow depression at base extending arcuately backward to the suture, becoming obsolete on the disk, and with a very narrow, deep groove between the humerus and lateral margin, extending along margin from the humeral angle to a very deep, broad depression behind the humerus, there is also a feeble depression along margin at apex; surface finely, sparsely punctate, and sparsely clothed with rather short, recumbent cinereous pubescence, the white pubescence forming an obsolete irregular fascia at middle, and with numerous white hairs scattered over basal half, an obsolete undulating fascia at apical third, the tips of the undulations connecting posteriorly to a less distinct transverse fascia at apical fourth. Abdomen beneath convex, sparsely and coarsely punctate, the punctures very shallow and open on the one side, sparsely clothed with short, recumbent, cinereous hairs; intervals finely and obsolete reticulate; last segment rather broadly rounded with a short, acute tooth at apex, on each side of

which is a small, oblong depression, the portion in front of the marginal groove acutely angulated. Elytral epipleura very narrow. Metasternum more coarsely punctured than the abdomen, and feebly rectangularly emarginate in front. Prosternum nearly truncate in front; prosternal process wide, three times as wide as coxal cavities, sides parallel, and very broadly, obsoletely rounded at apex; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat, with a narrow, deep groove behind the antennal groove; lateral margin nearly rectangular, becoming more acute posteriorly; antennal groove deep, short, following the suture between the episternum and epipleura, and extending into the latter to about the middle, and parallel to the lateral margin.

Female.—Differs from the male in having the last abdominal segment strongly, narrowly produced, and deeply, narrowly arcuately emarginate at apex, with three sharp equal teeth on each side of the emargination, arranged obliquely, and close together, the ventral surface with a moderately deep, longitudinal groove, extending from the apex to near the middle.

Length, 3.1 mm.; wide, 1.7 mm.

Type locality.—Type (male) Panama City, Panama; allotype (female) Paraiso, Canal Zone, Panama.

Type and allotype.—Cat. No. 25099, U.S.N.M.

Described from two specimens, one male collected by A. H. Jennings at Panama City, Panama, April 15, 1911, and a female collected by E. A. Schwarz at Paraiso, Canal Zone, Panama, May 6, 1911.

PACHYSCHELUS PUBICOLLIS Waterhouse.

Pachyschelus pubicollis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 153, pl. 8, fig. 24.

This species was described from material collected at Teapa in Tabasco, Mexico; San Miguel in the Pearl Islands, and from Taboga Islands, Panama; and San Juan in Vera Paz, Guatemala; without designating any of them as the type locality. It is represented in the National Museum Collection by 12 specimens as follows: Eight examples collected at Paraiso, Canal Zone, Panama, from March 5 to April 17, by E. A. Schwarz; two from the same locality collected March 28 and April 10, 1911, by A. H. Jennings; one taken by the same collector at Ancon, Canal Zone, Panama, March 4, 1911; and one collected at Finca Trece Aguas, Alta Vera Paz, Guatemala, at an altitude of 900 feet, April 1, 1906, by Messrs. Schwarz and Barber.

PACHYSCHELUS CUNEIFORMIS, new species.

Male.—Broadly cuneiform, considerably longer than wide, strongly narrowed posteriorly, shining; head and pronotum aeneous; scutellum and elytra dark violaceous; surface sparsely pubescent, the

pubescence forming two distinct transverse fasciae on the elytra; beneath piceous, with a slight aeneous reflection.

Head moderately convex, deeply, longitudinally grooved from vertex to epistome; surface nearly smooth, shining, with a few obsolete punctures, and the occiput very sparsely clothed with rather long cinereous hairs. Pronotum moderately convex, three times as wide as long at middle, much narrower in front than behind, widest at base; sides strongly, obliquely arcuate from base to apical angles, which are rectangular; anterior margin broadly, arcuately emarginate; base transversely truncate to the elytral lobe, where it is feebly, arcuately emarginate, and with a more obsolete emargination in front of scutellum; hind angles acute, projecting slightly beyond the humeral angles of the elytra and fitting closely to them; surface rather densely punctate, and finely granulate at the sides, the punctures large and very shallow, becoming obsolete on the disk, sparsely clothed at sides with rather long, recumbent, cinereous hairs. Scutellum smooth and glabrous, with the anterior angles acute. Elytra as wide as pronotum at base; humeral angles obtusely rounded; sides parallel to near the middle, then abruptly, obliquely attenuate to the tips, which are conjointly rounded, the lateral margin feebly serrate, and, when viewed from the side, is nearly straight, except for a feeble sinuation for the posterior femora; each elytron with a very shallow, round depression at the base, and a deeper one between the humerus and lateral margin, extending along margin from humeral angle to a very deep, broad depression behind the humerus; surface sparsely, rather finely punctate, and each elytron with two distinct transverse fasciae as follows: A rather wide undulating one at the middle, commencing at the margin just behind the depression where it is the widest, it curves upward to near the suture, and then turns obliquely downward to the suture, and a narrow straight one at the apical fourth, there are also a few dark, inconspicuous hairs on the basal half and between the fasciae, and a few short cinereous ones at the apex. Abdomen beneath moderately convex, sparsely punctate, the punctures very shallow and obsolete, and clothed with a few very short, recumbent, cinereous hairs; intervals finely and obsoletely reticulate; last segment acutely rounded at apex, the portion in front of marginal groove acutely rounded, with a short, sharp tooth at the apex. Elytral epipleura narrow. Metasternum more densely and coarsely punctured than abdomen, and nearly truncate in front. Prosternum rather broadly, arcuately emarginate in front; prosternal process nearly four times as wide as coxal cavities, sides nearly parallel, the apex nearly truncate, with the angles feebly rounded; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat, with a deep, narrow groove behind the antennal groove; lateral margin nearly rectangular; antennal groove rather wide, fol-

lowing the suture between the episternum and epipleura, and extending into the latter to about the middle, and parallel to the tibial groove.

Length, 2.5 mm.; width, 1.6 mm.

Type locality.—Porto Bello, Panama.

Type.—Cat. No. 25100, U.S.N.M.

Described from a unique male collected by E. A. Schwarz, February 15, 1911.

PACHYSCHELUS LATICEPS Waterhouse.

Pachyschelus laticeps WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 149-150, pl. 8, fig. 16.

This species was described from material collected by Mr. Champion at Tolé, Panama. No specimen has been examined that would fit the description of this species, and it is placed in the key solely upon the characters given in the original description.

PACHYSCHELUS BIFASCIATUS Waterhouse.

Pachyschelus bifasciatus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 151-152, pl. 8, fig. 19.

The type locality for this species is Teleman in Vera Paz, Guatemala, and was described from material collected by Mr. Champion. It is represented in the National Museum Collection by a specimen collected at Finca Trece Aguas, Alta Vera Paz, Guatemala, at an altitude of 900 feet, April 3, 1906, by Schwarz and Barber, and another example collected at Paraiso, Canal Zone, Panama, April 30, 1911, by E. A. Schwarz.

PACHYSCHELUS PURPUREIPENNIS Waterhouse.

Pachyschelus purpureipennis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 144, pl. 8, fig. 8.

This species was described from material collected by Mr. Champion at Bugaba and Volcan de Chiriqui, Panama, at an altitude of 3,000 feet. It is represented in the National Museum Collection by two examples collected at Paraiso, Canal Zone, Panama, May 6, 1911, by E. A. Schwarz. Both of the examples are females and vary slightly in color; one has the pronotum uniformly black and the elytra uniformly purple, while in the other the pronotum is black, with the sides narrowly margined with green, and the elytra is purple, with a strong bluish tinge on the disk.

PACHYSCHELUS BICOLOR Kerremans.

Pachyschelus bicolor Kerremans, Ann. Soc. Ent. France, vol. 63, 1894, p. 420.

Described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. The species is unknown to the writer, and has been given its position in the key solely upon the characters given in the original description.

PACHYSCHELUS ELEGANS Waterhouse.

Pachyschelus elegans WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 152, pl.8. fig. 20.

This species was described from material collected by Mr. Champion on Taboga Island, Panama. It is not represented by any material in the National Museum Collection, and is placed in the key from the characters given in the original description.

PACHYSCHELUS ALBOFASCIATUS, new species.

Male.—Broadly cuneiform, considerably longer than wide, strongly narrowed posteriorly, shining, uniformly, piceous, with a strong violaceous tinge above; surface rather sparsely pubescent, the pubescence forming transverse undulating fasciae on the elytra; beneath piceous, with a feeble aeneous reflection.

Head rather strongly convex, longitudinally grooved from occiput to epistoma, the groove rather deep on the front and vertex, becoming feebly defined on the occiput; surface very sparsely, obsoletely punctate, with a few rather long, cinereous hairs scattered over the vertex and occiput; intervals densely granulated on the front, becoming smoother posteriorly. Pronotum moderately convex, about three times as wide as long at the middle, much narrower in front than behind, widest at base; sides strongly, obliquely arcuate from base to apical angles, the edge strongly margined, and apical angles rectangular; anterior margin broadly arcuately emarginate; base nearly truncate, acutely emarginate at elytral lobes, and obsoletely emarginate in front of scutellum; hind angles acute, projecting beyond the humeral angles of the elytra and fitting closely to them; surface obsoletely depressed toward the sides, sparsely punctate, and very finely, densely granulate at the sides, the punctures large and very shallow, becoming obsolete on the disk, very sparsely clothed with long, recumbent, cinereous hairs. Scutellum obsoletely punctate, and glabrous, with the anterior angles rather broadly rounded. Elytra as wide as pronotum at base; humeral angles obtusely rounded; sides parallel to near the middle, then abruptly, obliquely attenuate to near the tips, which are conjointly broadly rounded, the lateral margin strongly serrate, and, when viewed from the side, is nearly straight, except for an abrupt sinuation for the posterior femora; each elytron with a broad, rather deep depression at the base, and a narrow, deeper one between the humerus and lateral margin, extending along margin from the humeral angle to near the middle, and becoming much broader posteriorly; surface finely and rather densely punctate, the punctures becoming much denser toward the humeral regions, sparsely, irregularly clothed with rather long, recumbent cinereous pubescence, forming designs on each elytron as follows: An irregular area behind the scutellum; a transverse fascia at the middle, com-

mencing at margin just behind the impression, it is directed downward to the middle, then upward, and joined anteriorly by a short fascia, then descending again to the suture; a narrow fascia commencing from the margin at apical fourth, extending obliquely upward to near the suture, then turning obliquely downward to the suture; there are also a few obsolete hairs near the apex. Abdomen beneath moderately convex, sparsely and obsoletely punctate, the punctures very shallow and open on the one side, sparsely clothed with a few very short, recumbent, cinereous hairs; intervals finely and densely reticulate; last segment broadly rounded, with a feeble tooth at apex, the portion in front of marginal groove acutely rounded, with a sharp tooth at the tip. Elytral epipleura narrow. Metasternum more coarsely and densely punctured than abdomen, and broadly arcuately emarginate in front. Prosternum feebly, arcuately emarginate in front; prosternal process about three times as wide as the coxal cavities, sides feebly expanded behind the coxae, and very broadly rounded at the apex; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat, with a deep, narrow groove behind the antennal groove; lateral margin nearly rectangular, becoming more acute posteriorly; antennal groove deep and rather wide, following the suture between the episternum and epipleura, extending into the latter to about the middle, and parallel to the lateral margin.

Female.—Differs from the male in having the last abdominal segment strongly, narrowly produced, and very widely, deeply, rectangularly emarginate at apex, with four sharp subequal teeth arranged obliquely on each side of the emargination, the ventral surface with a moderately deep, longitudinal groove, extending from the apex to near the middle.

Length, 2.5 mm.; width, 1.7 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type, allotype, and paratype.—Cat. No. 25101, U.S.N.M.

Described from three specimens, one male and two females, all of which were collected by E. A. Schwarz at the type locality. Male collected January 27, 1911; females, January 16 and April 18, 1911.

PACHYSCHELUS ATRIFRONS, new species.

Male.—Broadly cuneiform, considerably longer than wide, strongly narrowed posteriorly, shining, uniformly piceous, with a bluish-violeous tinge above; surface sparsely pubescent, the pubescence forming narrow transverse fasciae on the elytra; beneath piceous.

Head moderately convex; front feebly, longitudinally grooved; surface with a few obsolete punctures, from which arises a short cinereous hair; intervals obsoletely granulated on the front, becoming smooth and shining on the occiput. Pronotum rather strongly con-

vex, three times as wide as long at the middle, much narrower in front than behind, widest at base; sides strongly obliquely arcuate from base to apical angles, the edge strongly margined, and apical angles rectangular; anterior margin broadly, arcuately emarginate; base transversely truncate to elytral lobes, where it is acutely emarginate, more obsoletely emarginate in front of scutellum; hind angles acute, projecting considerably beyond the humeral angles of the elytra but not fitting very closely to them; surface sparsely punctate, and narrowly, densely granulate along the sides, the punctures large and very shallow, becoming obsolete on disk, and with a few very short, cinereous hairs. Scutellum smooth and glabrous, with the anterior angles rather acute. Elytra as wide as pronotum at base; humeral angles obtusely rounded; sides parallel to basal third, then abruptly, obliquely attenuate to near the tips, which are conjointly rounded, the lateral margin strongly serrate, and, when viewed from the side, is nearly straight, except for a feeble sinuation for the posterior femora; each elytron with an obsolete basal impression, and a very narrow one extending along the lateral margin from near the humeral angle to a broad, very deep impression behind the humerus; surface sparsely and rather coarsely punctate, and sparsely, irregularly clothed with rather long, recumbent, cinereous, and blackish hairs, the cinereous pubescence forming on each elytron a narrow transverse fascia at the middle, and a narrow, somewhat undulating one at the apical third. Abdomen beneath strongly convex, very sparsely and obsoletely punctate, with a few moderately long, recumbent, cinereous hairs; intervals finely and densely reticulate; last segment broadly rounded, with a long tooth at apex, which is parallel and extending slightly beyond the tips of the elytra, the portion in front of the marginal groove acutely rounded, with a sharp tooth at the tip. Elytral epipleura narrow. Metasternum more coarsely punctured than abdomen, and broadly, arcuately emarginate in front. Prosternum sparsely pubescent, and feebly, arcuately emarginate anteriorly; prosternal process three times as wide as the coxal cavities, sides distinctly expanded behind the coxae, and very broadly rounded at apex; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat, with a deep, very narrow groove behind the antennal groove; lateral margin rectangular, becoming more acute posteriorly; antennal groove deep and rather wide, following the suture between the episternum and epipleura, extending into the latter to about the middle, and parallel to the lateral margin.

Length, 2.7 mm.; width, 1.65 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type and paratype.—Cat. No. 25102, U.S.N.M.

Described from two male specimens. The type was collected by E. A. Schwarz, March 18, 1911. A paratype, which differs very

slightly from the type in having the upper surface of a more brownish-violaceous color, was collected by A. H. Jennings at the type locality April 10, 1911.

PACHYSHELUS SULCIFRONS, new species.

Male.—Broadly cuneiform, considerably longer than wide, strongly narrowed posteriorly, shining, uniformly dark aeneous above; surface moderately pubescent, the pubescence forming transverse undulating fasciae on the elytra; beneath piceous.

Head moderately convex, longitudinally grooved from occiput to epistoma, the groove rather deep on the front and vertex, becoming feebly defined on the occiput; surface sparsely, obsoletely punctate, and sparsely clothed, except on the front, with rather long cinereous hairs; intervals smooth except near the epistoma, where they are finely granulated. Pronotum moderately convex, three times as wide as long at middle, much narrower in front than behind, widest at the base; sides strongly, obliquely arcuate from base to apical angles, which are nearly rectangular; anterior margin broadly and rather deeply, arcuately emarginate; base nearly truncate, acutely emarginate; at elytral lobes, and obsoletely emarginate in front of scutellum; hind angles acute, projecting very slightly beyond the humeral angles of the elytra and fitting closely to them; surface broadly, obsoletely depressed toward the sides, and rather densely punctate, the punctures large and very shallow, becoming finer and obsolete on the disk, sparsely and irregularly clothed with long, recumbent, cinereous hairs. Scutellum smooth and glabrous, with the anterior angles acute. Elytra as wide as pronotum at base; humeral angles obtusely rounded; sides parallel to basal third, then abruptly, obliquely attenuate to near the tips, which are conjointly broadly rounded, the lateral margin strongly serrate, and, when viewed from the side, is nearly straight, except for an abrupt sinuation for the posterior femora; each elytron with a broad, shallow depression at the base, and a narrow, deeper one between the humerus and lateral margin, extending along margin from the humeral angle to a broad deep depression behind the humerus; surface finely, rather densely punctate, and sparsely, irregularly clothed with rather long, recumbent, yellowish pubescence, the pubescence on each elytron forming designs as follows: An elongate area behind the scutellum; a narrow fascia extending from humerus obliquely backward toward the suture; a transverse fascia at the middle, commencing at the margin just behind the depression, it extends downward, then obliquely upward and joining the fascia from the humerus, and then descends again to the suture; the posterior fascia, commencing from the margin at apical fourth, extends transversely to the middle, then horizontally toward the base, and then

turning obliquely downward to the suture; there is also an obsolete transverse fascia at the apex. Abdomen beneath moderately convex, sparsely and obsoletely punctate, clothed with a few inconspicuous recumbent, cinereous hairs; intervals finely and densely reticulate; last segment broadly rounded, with a feeble tooth at apex, the portion in front of marginal groove acutely rounded, with a sharp tooth at the tip. Elytral epipleura narrow. Metasternum more coarsely punctured than abdomen, and nearly truncate in front. Prosteronum feebly, arcuately emarginate in front; prosternal process about three times as wide as the coxal cavities, sides nearly parallel, and broadly rounded at apex; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat, with a deep, narrow groove behind the antennal groove; lateral margin rectangular, becoming more acute posteriorly; antennal groove deep and rather wide, following the suture between the episternum and epipleura, and extending into the latter to about the middle, and parallel to the lateral margin.

Female.—Differs from the male in having the last abdominal segment strongly, narrowly produced, and very broadly, arcuately, but not deeply emarginate at apex, with four very short subequal teeth arranged obliquely on each side of the emargination; ventral surface with a large, round, and rather deep depression at the apex.

Length, 2.4 mm.; width, 1.5 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type and allotype.—Cat. No. 25103, U.S.N.M.

Described from two specimens, male and female, collected by E. A. Schwarz at the type locality. The male was collected April 6, 1911, and the female May 7, 1911.

PACHYSCHELUS UNIFASCIATUS, new species.

Male.—Broadly cuneiform, considerably longer than wide, strongly narrowed posteriorly, shining, uniformly bottle-green above; elytra with a narrow transverse pubescent fascia at apical third; beneath piceous.

Head strongly convex, with a short, longitudinal depression on the front; surface shining, with a few very shallow punctures intermixed with finer obsolete ones. Pronotum moderately convex, three and one-half times as wide as long at middle, much narrower in front than behind, widest at base; sides strongly, obliquely arcuate from base to apical angles, which are rectangular; anterior margin rather deeply, arcuately emarginate; base nearly truncate, feebly sinuate at the elytral lobes, hind angles acute, projecting slightly beyond the humeral angles of the elytra and fitting closely to them; surface broadly, obsoletely depressed at the posterior angles, glabrous,

with a few very shallow punctures intermixed with finer, obsolete ones, and finely, densely granulated in the depressed areas at posterior angles. Scutellum obsoletely punctate, and glabrous, with the anterior angles nearly rectangular. Elytra as wide as pronotum at base; humeral angles obtusely rounded; sides parallel to near the middle, then abruptly, obliquely attenuate to near the tips, where they are more strongly narrowed, tips separately and rather acutely rounded, the lateral margin rather strongly serrate, and when viewed from the side, is nearly straight, except for an abrupt sinuation for the posterior femora; each elytron with a deep, narrow depression between the humerus and lateral margin, extending along margin from the humeral angles to a very deep, broad depression behind the humerus, basal depression not present; surface finely, sparsely punctate, and sparsely clothed with short, inconspicuous dark hairs, and with a narrow, transverse fascia of rather short, recumbent, cinereous hairs at apical third. Abdomen beneath moderately convex, sparsely and rather finely punctate, with a few inconspicuous hairs; intervals finely and densely reticulate; last segment broadly rounded, with a short tooth at the apex, the portion in front of marginal groove acutely angulated at tip. Elytral epipleura narrow. Metasternum more coarsely punctured than the abdomen, and feebly emarginate in front. Prosternum obsoletely emarginate in front; prosternal process about three times as wide as the coxal cavities, sides slightly expanded behind the coxae, and very broadly rounded at apex; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat, with a deep longitudinal groove behind the antennal groove; lateral margin rectangular, becoming acute posteriorly; antennal groove deep and rather wide, following the suture between the episternum and epipleura, and extending into the latter to about the middle, and nearly parallel to the lateral margin.

Female.—Differs from the male in having the last abdominal segment slightly produced, and obsoletely emarginate at apex, truncate and feebly sinuate on each side of the emargination; the ventral surface with a moderately deep, longitudinal groove, extending from the apex to apical third. The apex of the abdomen is probably somewhat deformed in this specimen.

Length, 3 mm.; width, 1.9 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type and allotype.—Cat. No. 25104, U.S.N.M.

Described from two specimens, male and female, both of which were collected by E. A. Schwarz at the type locality. The male was collected April 3, 1911, and the female May 10, 1911.

PACHYSCHELUS BIGUTTATUS Waterhouse.

Pachyschelus biguttatus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 153, pl. 8, fig. 22.

This species was described from material collected by Mr. Champion at Bugaba at an altitude of 800 to 1,500 feet, Volcan de Chiriqui at an altitude of 2,000 to 4,000 feet, and David, all in the Republic of Panama, without designating any definite type locality. It is represented in the National Museum Collection by one example collected at Paraiso, Canal Zone, Panama, February 8, 1911, by E. A. Schwarz; and two other specimens collected at Gatun, Canal Zone, Panama, April 7, 1911, one by E. A. Schwarz and the other one by A. H. Jennings.

PACHYSCHELUS STICTICUS Waterhouse.

Pachyschelus sticticus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 153, pl. 8, fig. 23.

Described from material collected by Mr. Champion at Tamahu, Senahu, and San Juan in Vera Paz, Guatemala. It is represented in the National Museum Collection by three examples collected at Finca Trece Aguas, Alta Vera Paz, Guatemala, at an altitude of 900 feet, during March and April, 1906, by Messrs. Schwarz and Barber.

PACHYSCHELUS UNDULATUS Waterhouse.

Pachyschelus undulatus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 151, pl. 8, fig. 18.

This species was described from material collected by Mr. Champion at Bugaba and San Lorenzo, Panama, without designating any definite type locality. No specimens of the species have been examined, and it has been placed in the key from the characters given in the original description.

PACHYSCHELUS AZUREUS Waterhouse.

Pachyschelus azureus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 152-153, pl. 8, fig. 21.

Described from material collected by Mr. Champion at Cahabon, Teleman, Chacoj, and Chiacam in Vera Paz, and El Tumbador at an altitude of 2,500 feet, all in Guatemala. It is represented in the National Museum Collection by one example from Livingston, Guatemala, May 12, 1906, and three specimens from Finca Trece Aguas, Alta Vera Paz, Guatemala, at an altitude of 900 feet, collected during April, 1906, by Messrs. Schwarz and Barber.

PACHYSCHELUS HYDROPOROIDES Waterhouse.

Pachyschelus hydroporoides WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 140.

This species is rather widely distributed and is a very convex and regularly oval species, superficially resembling some of the *Hydropori*.

It was described from material collected at Rio Hondo, Belize, British Honduras; Chacoj and San Geronimo in Vera Paz, Guatemala; Costa Rica; and Volcan de Chiriqui, Panama, at an altitude of 3,000 to 4,000 feet, without designating any of these places as the type locality. No specimens have been examined by the writer, and it is placed in the key solely upon the characters given in the original description.

PACHYSHELUS OBSOLETEPILOSUS, new species.

Female.—Broadly ovate, only slightly longer than wide, broadly rounded in front, more obliquely narrowed posteriorly, subopaque; head, pronotum, and elytra dark green; scutellum piceous; elytra with a few very short, inconspicuous, cinereous hairs protruding from the punctures; beneath piceous, more shining than above, with a slight aeneous reflection.

Head feebly convex and deeply embedded in the prothorax, feebly, longitudinally grooved on the front; surface sparsely, coarsely punctate, from each puncture arising a very short, obsolete hair; intervals with numerous finer punctures, and finely, densely granulated. Pronotum moderately convex, four and one-half times as wide as long at the middle, much narrower in front than behind, widest at base; sides strongly, obliquely arcuate from base to apical angles, which are nearly rectangular; anterior margin deeply, arcuately emarginated for the insertion of the head; base nearly truncate, abruptly sinuate at the elytral lobes; hind angles acute, projecting slightly beyond the humeral angles of the elytra and fitting closely to them; surface glabrous, rather densely punctate, the punctures larger and denser on the sides; intervals densely granulated, with a few fine punctures intermixed, the granulation much denser and more opaque on the sides. Scutellum finely, densely granulated, glabrous, with the anterior angles acute. Elytra as wide as pronotum at base, widest at basal third; humeral angles broadly rounded; sides broadly rounded to the middle, then arcuately attenuate to the tips, which are conjointly, very broadly rounded, the lateral margin entire, and when viewed from the side is slightly arcuate, with an abrupt sinuation for the posterior femora; each elytron with a broad, obsolete basal depression, and a deeper narrow one between the humerus and lateral margin, extending along margin from near the humeral angle to a very broad, deep depression behind the humerus, and then continuing posteriorly for a short distance along the margin; surface coarsely and rather densely punctate, with the intervals finely and densely reticulate, sparsely clothed with a few inconspicuous, short, cinereous hairs. Abdomen beneath feebly convex, sparsely and obsoletely punctate, with a few very short, inconspicuous hairs; intervals finely, and densely reticulate, with a few oblique rugae near the posterior legs; last segment is feebly sinuate on each side and

slightly produced, truncate at the apex, with a narrow V-shaped incision at the middle, and three short, blunt, equidistant teeth on each side; the portion in front of the marginal groove with two large, acute, distant teeth at the apex. Elytral epipleura narrow. Metasternum more coarsely and densely punctured than the abdomen, and nearly truncate in front. Prosternum feebly, arcuately emarginate anteriorly; prosternal process about four times as wide as the coxal cavities; sides slightly expanded behind the coxae, truncate at the apex with the angles broadly rounded; episternum flat, somewhat rectangular, slightly more attenuate anteriorly. Prothoracic epipleura wide and nearly flat, with a deep, narrow groove behind the antennal groove; lateral margin rectangular, becoming acute posteriorly; antennal groove deep and wide, following the suture between the episternum and epipleura, extending into the latter to the tibial groove and parallel to the lateral margin.

Length, 3.1 mm.; width, 2.6 mm.

Type locality.—Piedras Negras, Costa Rica.

Type.—Cat. No. 25105, U. S. N. M.

Described from a unique female in the National Museum Collection labeled "Piedr. Negras, Costa Rica, Coll. Schild and Burgdorf."

PACHYSCHELUS CENTRALIS Waterhouse.

Pachyschelus centralis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 148.

This is one of the most rotund species and was described from material collected by Mr. Champion at El Tumbador, Guatemala, at an altitude of 2,500 feet. It is not represented in the National Museum Collection, and it has been given its position in the key solely upon the characters given in the original description.

PACHYSCHELUS OVALIS Waterhouse.

Pachyschelus ovalis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 140.

Described from material collected at Rio Hondo, British Honduras; San Geronimo and Chiacam in Vera Paz, and El Tumbador, Guatemala, without designating any type locality. No specimens have been examined of this species, and it is placed in the key from the characters given in the original description.

PACHYSCHELUS ASTRAEUS Waterhouse.

Pachyschelus astraeus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 147.

This species was described from material collected at Cordoba and Atoyac in Vera Cruz, Mexico. It is not represented in the National Museum Collection, and has been placed in the key from the characters given in the original description.

PACHYSCHELUS DISCOIDALIS Waterhouse.

Pachyschelus discoidalis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 145-146, pl. 8, fig. 11.

This beautiful rotund species was described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an elevation of 3,000 to 4,000 feet. It is represented in the National Museum Collection by a single female collected at Zent, 20 miles from the Port Limon, Costa Rica, September 26, by Frederick Knab.

PACHYSCHELUS MODESTUS Waterhouse.

Pachyschelus modestus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 147, pl. 8, fig. 14.

The type locality for this species is Bugaba, Panama, and was described from material collected by Mr. Champion. Waterhouse also records a female from Volcan de Chiriqui, Panama, which has the purple color on the elytra more extended than in the type. There are no specimens of this species in the National Museum Collection, and it has been placed in the key from the characters given in the original description.

PACHYSCHELUS AVERSUS Waterhouse.

Pachyschelus aversus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 146-147, pl. 8, fig. 13.

This species was described from material collected by Sallé at Cordoba, Mexico. No specimens have been seen by the writer that will agree with the description given for these species, and its position in the key is based entirely upon the characters given in the original description.

PACHYSCHELUS SUBOPACUS, new species.

Male.—Broadly ovate, slightly longer than wide, more strongly narrowed behind than in front, subopaque, glabrous dark cyaneous; head and pronotum with a greenish tinge; elytra with a rather strong aeneous tinge on the disk; beneath piceous, more shining than above, with a feeble aeneous reflection.

Head feebly convex and rather deeply embedded in the prothorax; front obsoletely, longitudinally grooved; surface sparsely but distinctly punctate, with the intervals obsoletely granulated. Pronotum moderately convex, four times as wide as long at the middle, much narrower in front than behind, widest at base; sides strongly, obliquely arcuate from base to apical angles, the edge strongly margined and apical angles rectangular; anterior margin deeply, arcuately emarginate; base nearly truncate, rather strongly sinuate at elytral lobes; hind angles acute, projecting slightly beyond the humeral angles of the elytra and fitting closely to them; surface glabrous, sparsely punctate, and very densely finely granulated, the punctures large and distinct at the sides, becoming smaller and obso-

lete on the disk. Scutellum sparsely, finely punctate and finely, densely granulated, glabrous, with the anterior angles nearly rectangular. Elytra as wide as pronotum at base, widest at basal fourth; humeral angles broadly rounded; sides broadly rounded to middle, then arcuately attenuate to the tips, which are conjointly broadly rounded, the lateral margin rather strongly serrate, and when viewed from the side is broadly arcuate, with a feeble sinuation for the posterior femora; each elytron with a broad, obsolete depression at the base, and a deeper one between the humerus and lateral margin, extending along the margin from the humeral angle to a round, deep depression behind the humerus, and then extending posteriorly along the margin, causing the elytron to have an obsolete lateral carina; surface coarsely and rather densely punctate, the punctures arranged in rows on the disk, the intervals finely, densely punctate and finely reticulate, sparsely clothed with very short, inconspicuous hairs. Abdomen beneath feebly convex, sparsely and rather finely punctate, with a few very short, inconspicuous hairs; intervals finely and densely reticulate; last segment rather acutely angulated at apex, with the margin flattened, the portion in front of the marginal groove a little more broadly angulated than the outer portion. Elytral epipleura narrow. Metasternum more coarsely punctured than the abdomen, and broadly, arcuately emarginate in front. Prosternum very feebly arcuately emarginate anteriorly; prosternal process about four times as wide as the coxal cavities, sides nearly parallel, and very broadly rounded at apex; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat, with a deep, narrow groove behind the antennal groove, and a more shallow depression between it and the lateral margin, which is rather acute; antennal groove deep and wide, following the suture between the episternum and epipleura, extending into the latter to a little beyond the middle, and nearly parallel to the lateral margin.

Female.—Differs from the male in being of a darker blue color, and having the last abdominal segment narrowed and feebly produced at the apex, with eight teeth arranged in a semicircle, the central pair distinctly more widely separated than the others, and the two inner pairs a little shorter than the outer ones, the portion in front of the marginal groove with a large round lobe at apex, and the surface broadly transversely concave.

Length, 3.4 mm.; width, 2.4 mm.

Type locality.—Type (male) Trinidad River, Panama; allotype (female) Ancon, Canal Zone, Panama.

Type and allotype.—Cat. No. 25106, U.S.N.M.

Described from two specimens, male and female. The type was collected by August Busck May 7, 1911, and the allotype by A. H. Jennings.

PACHYSCHELUS NIGRICOLLIS Waterhouse.

Pachyschelus nigricollis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 148, pl. 7, figs. 21, 21a.

This species was described from material collected by Sallé at Cordoba, Mexico. No specimens of this species have been examined by the writer, and it is placed in the key from the characters given in the original description.

PACHYSCHELUS COMPACTUS Waterhouse.

Pachyschelus compactus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 138-139, pl. 7, figs. 15, 15a.

This small, oval species is the most variable in color of all the species in the genus. The typical form was described from material collected by Mr. Champion at Bugaba at an altitude of 1,000 feet, and Volcan de Chiriqui at an altitude of 2,500 to 4,000 feet, all in the Republic of Panama. It is also reported from the following localities: David, San Miguel in the Pearl Islands, Panama; Teapa in Tabasco, Atoyac in Vera Cruz, Mexico; San Juan and Chiacam in Vera Paz, and El Tumbador, Guatemala; and Belize, British Honduras. It is represented in the National Museum Collection by four examples collected at Porto Bello, Panama, during February and March, 1911, by E. A. Schwarz. Three of these are the typical form in which the head and pronotum are dark blue, and the elytra dark blue or green. The other specimen, which was taken with the typical form, is the variety with the head and pronotum cupreous, and the elytra dark blue, with a greenish tinge.

PACHYSCHELUS CHAPUISI (Dugès).

Brachys chapuisi DUGÈS, La Natureza, ser. 2, vol. 2, 1891, p. 36, pl. 2, fig. 63.

This species was described from Tupatora, Mexico, and placed in the genus *Brachys* by Dugès. There is a female specimen in the National Museum Collection, which was received for determination from Eugenio Dugès a number of years previous to the publication of his description, and labeled in his own handwriting, "#2030, *Brachys chapuisi*, E. Dug." without any locality given. This specimen probably was taken from the same set from which he described the species a few years later. Four specimens, two males and two females, were received from Prof. H. F. Wickham, which were collected by himself at Durango and Tepehuanes, State of Durango, Mexico. These specimens are exactly like the example received from Dugès.

PACHYSCHELUS DEPLANATUS (Chevrolat).

Lius deplanatus CHEVROLAT, Silbermann's Rev. Ent., vol. 5, 1838, pp. 104-105.

This species was described in the genus *Lius* from material collected at Orizaba, Mexico. It is very closely allied to *Pachyschelus chapuisi* (Dugès), but Chevrolat states that *deplanatus* has the underside of

the body blackish-green, while in *chapuisi*, there is not the slightest tinge of green on the underside. The species is not represented in the National Museum Collection, and it is placed in the key solely upon the characters given in the original description.

PACHYSCHELUS UNICOLOR, new species.

Male.—Subtrapeziformis, considerably longer than wide, strongly narrowed posteriorly, shining, glabrous, uniformly piceous, with a feeble violaceous reflection on the elytra; beneath piceous.

Head strongly convex, feebly, longitudinally grooved from vertex to epistoma; surface sparsely, but distinctly punctate, and finely, densely granulated over entire surface. Pronotum moderately convex, not quite three times as wide as long at the middle, much narrower in front than behind, widest at base; sides strongly, obliquely arcuate from base to apical angles, which are rectangular; anterior margin broadly and rather deeply arcuately emarginate; base nearly truncate, abruptly sinuate at elytral lobes; hind angles acute, scarcely projecting beyond the humeral angles of the elytra and fitting closely to them; surface glabrous, rather densely punctate and finely, densely granulated at the sides, the punctures large and very shallow, becoming obsolete on the disk. Scutellum smooth and glabrous, the anterior angles acute. Elytra as wide as pronotum at base; humeral angles obtusely rounded; sides obliquely attenuate from base to the tips, and slightly sinuate near the middle, tips conjointly broadly rounded, the lateral margin feebly serrate, and when viewed from the side is nearly straight, except for a slight sinuation for the posterior femora; each elytron with an obsolete depression at the base, and a broad, deep one along lateral margin behind the humerus; surface glabrous, sparsely and coarsely punctate, the punctures very shallow on the disk, becoming feebly rugose in the humeral regions, the intervals rather smooth, becoming finely, densely granulated at the sides. Abdomen beneath strongly convex, sparsely and obsoletely punctate, with a few very short inconspicuous hairs; intervals finely and densely reticulate; last segment broadly rounded, with an obsolete tooth at the tip, the portion in front of the marginal groove rather acutely angulated at apex. Elytral epipleura narrow. Metasternum more coarsely punctured than abdomen, and nearly truncate in front. Prosternum feebly, arcuately emarginate anteriorly; prosternal process about three times as wide as the coxal cavities; sides slightly expanded behind the coxae, and broadly rounded at apex; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat, with a deep narrow groove behind the antennal groove; lateral margin rectangular; antennal groove deep, following the suture between the episternum and epipleura, extending into the latter to the tibial groove, and parallel to the lateral margin.

Length, 2.5 mm; width, 1.5 mm.

Type locality.—Panama City, Panama.

Type.—Cat. No. 25107, U.S.N.M.

Described from a single male collected by E. A. Schwarz, January 31, 1911.

PACHYSCHELUS ARDENS Waterhouse.

Pachyschelus ardens WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 144, pl. 8, fig. 1.

The type locality is Cordoba, Mexico, and was described from material collected by Sallé. It is not represented in the National Museum Collection, and has been given its position in the key entirely upon the characters given in the original description.

PACHYSCHELUS AFFINIS Waterhouse.

Pachyschelus affinis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 143-144, pl. 8, fig. 7.

This species was described from single examples collected by Mr. Champion at each of the following localities in Panama: Bugaba, Volcan de Chiriqui, 3,000 feet, and Pena Blanca, 3,000 feet. Waterhouse does not designate any of these places as the type locality. The writer has not been able to examine any specimens of this species, and it is placed in the key solely upon the characters given in the original description.

PACHYSCHELUS GRANULOSICOLLIS Waterhouse.

Pachyschelus granulocollis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 146, pl. 7, fig. 20.

This species was described from material collected by Mr. Champion at San Geronimo, Guatemala. No specimens have been examined, and it is placed in the key from the characters given in the original description.

PACHYSCHELUS CUPRICAUDA, new species.

Male.—Broadly cuneiform, considerably longer than wide, strongly narrowed posteriorly, shining, nearly glabrous; head and sides of pronotum bright green; scutellum and disk of pronotum bluish-green; elytra cyaneous, with the apical third of a bright reddish-coppery color, the coppery area narrowly margined anteriorly with a strong violaceous color; beneath piceous.

Head strongly convex, feebly, longitudinally grooved from vertex to epistoma; surface sparsely but distinctly punctate, and finely granulated, the granulation dense and as prominent as the punctation on the front, but becoming smoother on the occiput. Pronotum moderately convex, three times as wide as long at the middle; much narrower in front than behind, widest at base; sides strongly obliquely arcuate from base to apical angles, which are rectangular; anterior margin deeply, arcuately emarginate; base nearly truncate,

abruptly sinuate at elytral lobes; hind angles acute, scarcely projecting beyond the humeral angles of the elytra and fitting closely to them; surface sparsely punctate, and very densely granulated at the sides, the punctures large and very shallow, very sparsely clothed with short, inconspicuous hairs. Scutellum finely, densely granulated, and glabrous, the anterior angles acute. Elytra as wide as pronotum at base, slightly wider at basal fourth; humeral angles obtusely rounded; sides feebly rounded to near the middle, then obliquely attenuate to near the tips, which are conjointly rounded; the lateral margin feebly serrate, and when viewed from the side is nearly straight, with scarcely any sinuation for the insertion of the posterior femora; each elytron with a shallow depression between the humerus and lateral margin, extending along margin from the humeral angles to a broad, deep depression behind the humerus, and with only a trace of a basal depression; surface rather densely and coarsely punctate, the punctures becoming obsolete on the coppery colored apical area, where the surface is rather finely and densely reticulate, sparsely clothed with very short, inconspicuous hairs. Abdomen beneath moderately convex, sparsely and very finely punctate, and clothed with a few inconspicuous hairs; intervals very finely and obsoletely reticulate; last segment rather acute at the apex, with the portion in front of the marginal groove broadly rounded, with an acute tooth at the apex. Elytral epipleura narrow. Metasternum more coarsely punctured than the abdomen, the punctures large and very shallow, and rather deeply emarginate in front. Prosternum feebly, arcuately emarginate in front; prosternal process rather wide, about four times as wide as the coxal cavities, sides nearly parallel, and very broadly rounded at apex; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat; antennal groove deep, following the suture between the episternum and prothoracic epipleura into the latter, and extending to the lateral margin behind the middle, and nearly parallel to it; lateral margin nearly rectangular.

Female.—Differs from the male in having the head and pronotum of a uniform bluish-green color, and the last abdominal segment feebly produced at apex, with four teeth placed slightly obliquely on each side, the two sets of teeth separated by a very narrow space, the first tooth is rather acute and separated at base, second and third teeth broad, parallel, broadly rounded at apex and connate at base, and the fourth one very acute and slightly shorter than the others; the portion in front of the marginal groove broadly rounded at apex without median depression.

Length, 2.6 mm.; width, 1.75 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Other localities.—Taboga Island, Canal Zone, Panama.

Type, allotype, and paratypes.—Cat. No. 25108, U.S.N.M.

Described from a series of 66 specimens. The type, allotype, and six paratypes were collected at Paraiso, Canal Zone, Panama, by E. A. Schwarz between April 2 and April 18, 1911; one specimen collected at Paraiso, Canal Zone, Panama, April 10, 1911, and another one at Taboga Island, Panama, by A. H. Jennings; and the balance of specimens were reared from living leaves, from an undetermined plant collected on Taboga Island, Canal Zone, Panama, by August Busck July, 1907.

Some of the paratypes from Taboga Island have the head and pronotum strongly violaceous.

PACHYSCHELUS FULGENS Waterhouse.

Pachyschelus fulgens WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 141, pl. 7, fig. 17.

Described from material collected by Mr. Conradt at Coban in Vera Paz, Guatemala. It is not represented in the National Museum Collection, and is placed in the key entirely upon the characters given in the original description.

PACHYSCHELUS CONSTANS Waterhouse.

Pachyschelus constans WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 137.

This species was described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an elevation of 2,000 to 4,000 feet. It is represented in the National Museum Collection by two specimens, which are probably paratypes, received from F. D. Godman and labeled, "Volcan de Chiriqui, 25-4000 ft. Champion."

PACHYSCHELUS PANAMENSIS, new species.

Male.—Broadly cuneiform, considerably longer than wide, strongly narrowed posteriorly; shining, nearly glabrous; head and sides of pronotum bright aeneous; scutellum and disk of pronotum piceous, with a feebly aeneous reflection; elytra piceous, with a strong bluish-green and violaceous tinge; beneath piceous.

Head strongly convex, feebly longitudinally grooved from vertex to epistoma; surface sparsely, obsoletely punctate, and finely granulated, the granulation dense and as prominent as the punctation on the front, but becoming smoother on the occiput. Pronotum moderately convex, three times as wide as long at the middle, much narrower in front than behind, widest at base; sides strongly obliquely arcuate from base to apical angles, the edge rather strongly margined and the apical angles rectangular; anterior margin rather deeply, arcuately emarginate; base nearly truncate, abruptly emarginate at elytral lobes; hind angles acute, scarcely projecting beyond the humeral angles of the elytra and fitting closely to them; surface

sparsely punctate and densely granulated, the granulation much denser at the sides, clothed with a few short, very inconspicuous hairs. Scutellum finely, obsoletely punctate, and glabrous, the anterior angles acute. Elytra as wide as pronotum at base, slightly wider at at basal fourth; humeral angles obtusely rounded; sides feebly rounded to near the middle, then obliquely attenuate to the tips, which are conjointly, rather narrowly rounded, the lateral margin rather strongly serrate, and when viewed from the side is nearly straight, except for a slight sinuation for the insertion of the posterior femora; each elytron with rather deep, narrow depression between the humerus and elytral margin, extending along the margin from the humeral angles to a much broader depression behind the humerus, with only a trace of a basal depression; surface rather densely and coarsely punctate, the intervals nearly smooth on disk, becoming finely granulated and somewhat rugose at the sides and humeral region, and with a few very short, inconspicuous hairs. Abdomen beneath strongly convex, sparsely and obsoletely punctate, the punctures very shallow and open on the one side, sparsely clothed with short, inconspicuous, cinereous hairs; intervals finely and densely reticulate; last segment rather acutely rounded at the apex, with the margin flattened, the portion in front of the marginal groove acutely angulated, with the tip very acute. Elytral epipleura narrow. Metasternum more coarsely punctured than the abdomen, and rather deeply, rectangularly emarginate in front. Prosternum feebly, arcuately emarginate anteriorly; prosternal process about three times as wide as the coxal cavities, sides slightly expanded behind coxae, truncate at the apex with the angles broadly rounded; episternum short, flat, and triangular. Prothoracic epipleura wide and nearly flat, with a deep, narrow groove behind the antennal groove; lateral margin rectangular; antennal groove deep, following the suture between the episternum and epipleura, extending into the latter to the tibial groove and parallel to it.

Female.—Differs from the male in having the head and pronotum of a uniform piceous color, with a slight aeneous reflection, and the last abdominal segment narrow and strongly produced at the apex, deeply, narrowly and arcuately emarginate at the middle, with a very strong tooth on each side of it, next to which is a less strong and slightly shorter tooth, and on the outside a very small acute tooth at a lower level; the ventral surface with a broad, obsolete median depression.

Length, 2.25 mm.; width, 1.4 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Other localities.—Panama City, Panama.

Type, allotype, and paratypes.—Cat. No. 25109, U.S.N.M.

Described from 16 specimens, 8 males and 8 females, 14 of which were collected by E. A. Schwarz, at Paraiso, Canal Zone, Panama, on March 20 and April 2, 1911; and a male and female taken by the same collector at Panama City, Panama, March 23, 1911.

PACHYSCHELUS DUBIUS Waterhouse.

Pachyschelus dubius WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 143, pl. 8, fig. 6.

This species was described from material collected by Mr. Champion at Teleman in Vera Paz, Guatemala; and Volcan de Chiriqui, Panama, at an altitude of 2,000 to 4,000 feet. It is not represented in the National Museum Collection, and the species has been placed in the key entirely upon the characters given in the original description.

PACHYSCHELUS CYANELLUS (Castelnau and Gory).

Brachys cyanella CASTELNAU and GORY, Mon. Bupr., vol. 2, Brachys, 1839, pp. 8-9, pl. 2, fig. 12.

This species was described from Colombia, South America. There are two males in the National Museum Collection which agree fairly well with the short description given for this species, both of which were collected at Paraiso, Canal Zone, Panama, January 28 and April 18, 1911, by E. A. Schwarz.

PACHYSCHELUS DIVERSUS Waterhouse.

Pachyschelus diversus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 143, pl. 7, fig. 16.

The type locality of this species is Chiacam in Vera Paz, Guatemala, and was described from material collected by Mr. Champion. No specimens have been examined, and the characters given in the original description have been used as the basis for its position in the key.

PACHYSCHELUS SOLITARIUS Kerremans.

Pachyschelus solitarius KERREMANS, Ann. Soc. Ent. France, vol. 63, 1894, p. 421.

This species was described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. The species is unknown to the writer, and has been placed in the key entirely upon the characters given in the original description.

PACHYSCHELUS THORACICUS Waterhouse.

Pachyschelus thoracicus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 139-140.

Described from material collected by Mr. Champion at Capetillo, and Chiacam in Vera Paz, Guatemala. The species is not represented in the National Museum Collection, and it is placed in the key solely upon the characters given in the original description.

PACHYSCHELUS INCERTUS Waterhouse.

Pachyschelus incertus WATERHOUSE, Biol. Centra.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 142, pl. 8, fig. 4.

The type locality for this species is Taboga Island, Panama, and it was described from material collected by Mr. Champion. The type, which is in the British Museum, has not been examined, and the species has been given its position in the key solely upon the characters given in the original description.

PACHYSCHELUS FAMILIARIS Waterhouse.

Pachyschelus familiaris WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 141-142, pl. 8, fig. 9.

This species was described from material collected by H. H. Smith at Teapa in Tabasco, Mexico. There are four specimens in the National Museum Collection which agree very well with the description of this species, although they were collected in Panama. Two of these specimens were collected at Paraiso, Canal Zone, Panama, January 26 and March 26, 1911, by E. A. Schwarz; and the other two examples collected by A. H. Jennings, one at Paraiso, Canal Zone, Panama, and the other at Panama City, Canal Zone, Panama, during 1911.

PACHYSCHELUS COMMUNIS Waterhouse.

Pachyschelus communis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 141, pl. 8, fig. 3.

The type locality for this species is Taboga Island, Panama, and was described from material collected by Mr. Champion. It is represented in the National Museum Collection by six specimens, which are probably paratypes, received from F. D. Godman and labeled "Taboga Isl., Panama, Champion."

PACHYSCHELUS OCTODENTATUS Waterhouse.

Pachyschelus octodentatus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 142, pl. 8, fig. 5.

This species was described from material collected by Mr. Champion at Bugaba and David, Panama. It is represented in the National Museum Collection by a unique female collected at Ancon, Canal Zone, Panama, May 5, 1911, by E. A. Schwarz.

PACHYSCHELUS SECEDENS Waterhouse.

Pachyschelus secedens WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 145, pl. 8 fig. 2.

Described from material collected by Höge at Tupatáro in Guanajuata, Mexico. It is also reported by Waterhouse from Cordoba and northern Sonora, Mexico. It is represented in the National Museum Collection by a female collected at Cordoba, Vera Cruz,

Mexico, April 12, 1908, by Frederick Knab, and a male collected at Finca Trece Aguas, Alta Vera Paz, Guatemala, at an altitude of 900 feet, April 9, 1906, by Schwarz and Barber. The specimen from Guatemala has the pronotum more widely margined with a lighter shade of green than the female from Mexico.

Genus BRACHYS Solier.

Brachys SOLIER, Ann. Soc. Ent. France, ser. 1, vol. 2, 1833, pp. 312-313.

About 100 species have been described in this genus and their distribution is confined to the Western Hemisphere. Of this large number of species, 9 have been described from the United States, 13 from Mexico and Central America, and the remainder from South America. The species of this genus attain their highest development in the tropical parts of South America.

Brachys chapuisi described by Dugès from Mexico⁶ belongs to the genus *Pachyschelus*.

The following species described from Mexico and Central America have been omitted from the key, as it has been impossible to correlate the characters given in the original descriptions with those used in the key, and the writer has been unable to examine any specimens of these species: *hexagonalis* Dugès, from Mexico; *scapulosus* Chevrolat, from Mexico; *suaavis*, *taciturnus*, and *debilis*, all described by Kerremans, from Guatemala.

KEY TO THE SPECIES.

1. Elytra without lateral carina..... 2
- Elytra with lateral carina..... 3
2. Above unicolored, aureous with indistinct pubescent spaces... *fulgidus* Fisher.
- Above bicolored; head and pronotum cupreous; elytra bluish-green, with distinct pubescent spaces..... *simplex* Waterhouse.
3. Lateral carina on elytra interrupted at middle..... *dimidiatus* Waterhouse.
- Lateral carina on elytra not interrupted at middle..... 4
4. Elytra with tufts of hair..... *floccosus* Mannerheim.
- Elytra without tufts of hair..... 5
5. Pronotum without lateral carina..... 6
- Pronotum with short lateral carina..... 7
6. Sides of pronotum broadly flattened..... *bellus* Fisher.
- Sides of pronotum not broadly flattened..... *cuprifrons* Fisher.
7. Epistoma with a transverse carina..... 8
- Epistoma without transverse carina..... 11
8. Elytra brown, with a strong aeneous tinge..... *pilosus* Fisher.
- Elytra piceous, with a violaceous, cupreous, or greenish tinge..... 9
9. Elytra piceous, with a greenish tinge, and with transverse pubescent spaces.
- *nigroviridis* Fisher.
- Elytra piceous, with a violaceous or cupreous tinge..... 10
10. Pubescence on elytra forming transverse designs.... *anthrenoides* Waterhouse.
- Pubescence on elytra not forming transverse designs..... *confusus* Fisher.

⁶La Natureza, ser. 2, vol. 2, 1891, p. 36, pl. 2, fig. 63.

11. Elytra cyaneous, with a violaceous tinge..... 12
 Elytra piceous, with violaceous, cupreous, or greenish tinge..... 13
12. Median fascia on elytra distinct, irregular, and composed of fulvous hair, bordered in front and behind with whitish ones; apex of abdomen with a series of obsolete teeth..... *distinctus* Waterhouse.
 Median fascia rather indistinct, transverse, and composed of fine whitish hair; apex of abdomen with distinct teeth..... *laetus* Waterhouse.
13. Elytra piceous, with a strong violaceous tinge; each elytron with two cinereous pubescent areas, inclosing a round dark space, one near the middle close to the lateral carina, the other near the apex..... *elegans* Fisher.
 Elytra piceous, with cupreous or greenish tinge..... 14
14. Elytron with the pubescent space at apex inclosing a round dark area.
ornatus Fisher.
 Elytron with the pubescent space at apex not inclosing a round dark area.
pulverosus Waterhouse.

BRACHYS FULGIDUS, new species.

Female.—Broadly ovate, slightly longer than wide, broadly rounded in front, slightly narrower behind than in front, strongly shining and nearly glabrous; head bluish-green; pronotum, scutellum, and elytra aureous, with a strong cupreous tinge, the pronotum with the anterior angles greenish; beneath piceous, with a strong greenish reflection.

Head nearly flat, longitudinally grooved from occiput to epistoma, the groove becoming deeper and broader behind the epistoma, and with a broad, shallow depression on the occiput; surface glabrous and irregularly punctate, the punctures large, deep, widely separated, and becoming more obsolete on the occiput; intervals densely, obsoletely granulated, and finely reticulate, the reticulation irregular and widely separated; epistoma wide between the antennal cavities, surface depressed, with a feeble transverse carina in front of the depressed area. Pronotum strongly flattened, about three times as wide as long at middle, distinctly narrower in front than behind, widest at base; sides arcuately attenuate from base to anterior angles; anterior margin arcuately emarginate for the insertion of the head; base transversely truncate to the elytral lobe, then turning obliquely backward to the scutellum, in front of which it is nearly truncate; posterior angles nearly rectangular and feebly rounded; surface glabrous and uneven, with an obsolete depression extending obliquely backward from the anterior angles to the median part, sparsely and irregularly punctate, the punctures very shallow and more numerous at the sides; intervals obsoletely granulated, and with a few very fine punctures. Scutellum nearly smooth, broadly triangular, anterior margin truncate. Elytra scarcely as wide as pronotum at base; humeral angles broadly rounded; sides parallel to near middle (feebly sinuate at basal fourth), then arcuately attenuate to the tips, which are conjointly broadly rounded, the lateral margins feebly serrate toward the apex; each elytron with a rather deep, broad depression at the base, and the disk rather

uneven and without lateral carina, sparsely and irregularly punctate, with a very small spot of rather long, recumbent, cinereous pubescence at the middle, close to the suture; intervals nearly smooth. Abdomen beneath rather flat, sparsely punctate, the punctures large, shallow and open on the one side, and from each one arises a short, recumbent, cinereous hair; intervals densely and finely granulated; last segment broadly rounded at the apex, with the margin entire.

Length, 3.75 mm.; width, 2.3 mm.

Type locality.—Panama City, Panama.

Type.—Cat. No. 25110, U.S.N.M.

Described from a unique female reared from larvae mining in the leaves of an unknown plant, the leaves of which are similar to that of the rubber plant (*Ficus elastica*), and collected by August Busck.

This species is distinguished from nearly all the other species of this genus by being much depressed, nearly glabrous, and the elytra without lateral carina.

The eggs are laid on the upper surface of the leaves, and as many as 12 eggs having been layed on a single leaf. The eggs are brown in color, strongly flattened, and oval, measuring 2.2 by 1.75 millimeters. The larva on hatching bores directly into the leaf from the underside of the egg, and mines under the upper epidermis of the leaf. The mines are usually elongate, very irregular, and measuring about 12 centimeters in length. At first the mines are only 2 millimeters wide, but are gradually broadened until they are about 15 millimeters in width. The larva on reaching maturity pupates in the leaf without making any cell.

BRACHYS SIMPLEX Waterhouse.

Brachys simplex WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 134-135, pl. 7, fig. 14.

This species was described from San Geronimo, Guatemala, and the type, which is in the British Museum, has not been examined. It is the only species known from Mexico and Central America, with the exception of *fulgidus* Fisher, which has no lateral carina on the elytra.

BRACHYS DIMIDIATUS Waterhouse.

Brachys dimidiatus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 134.

The type locality of this species is Cerro Zunil, Guatemala, at an elevation of 4,000 feet. The type is in the British Museum and has not been examined. This is the only known species from the region covered by this paper which has the lateral carina interrupted at the middle, and is intermediate between the species which have the lateral carina on the elytra entire and those without any trace of a carina. No specimens have been examined of this species and it is placed in the key upon the characters given in the original description.

BRACHYS FLOCCOSUS Mannerheim.

Brachys floccosa MANNERHEIM, Bull. Soc. Imp. Nat. Moscow, vol. 10, No. 8, 1837, pp. 118-119.

This species has been described from Oaxaca, Mexico. It has been reported also from Guatemala by Waterhouse,⁷ and is represented in the National Museum Collection by 11 specimens collected at Rincon Antonio, Oaxaca, Mexico, by Frederick Knab.

It is easily distinguished from all the other known species found in the region covered by the present paper by the distinct tufts of hair on the posterior part of the elytra. The males have the last abdominal segment broadly rounded, and armed with a series of obsolete teeth, and the head rather densely clothed with either golden or pale yellow pubescence, with two glabrous spaces on the vertex. Females have the last abdominal segment subtruncate and armed with a series of short distinct teeth, which are rather broadly rounded at tips, equal in length, and of equal distance apart; head not as densely pubescent as in the male, the pubescence composed of cinereous and fulvous hairs intermixed, with four glabrous spaces, two of which are on the front and two on the vertex.

BRACHYS BELLUS, new species.

Male.—Broadly cuneiform, distinctly longer than wide, broadly rounded in front, slightly narrower behind than in front, shining, and with distinct pubescent fasciae on the elytra; head and pronotum aeneous, with a slight cupreous tinge; scutellum piceous; elytra cyaneous, the humeral areas and the space behind the first transverse pubescent fascia strongly violaceous, and the apex aeneo-viridis; beneath piceous.

Head feebly convex and transversely flattened behind the epistoma, with a rather deep groove extending from the occiput to a broad, deep depression on the front, the groove becoming obsolete on the flattened area behind the epistoma; surface densely punctured behind the epistoma, the punctures becoming more widely separated on the vertex and occiput, and nearly obsolete in the median depression, clothed with rather long fulvous pubescence, the pubescence dense and erect behind the epistoma, becoming sparser and recumbent posteriorly, and nearly glabrous in the median depression; intervals finely, densely, and obsolete granulated; epistoma rather wide between the antennal cavities, surface flat and not transversely carinate in front. Pronotum moderately convex, two times as wide as long at middle, slightly narrower in front than behind, widest at apical third; sides broadly rounded to middle, then parallel to the posterior angles, which are rectangular; anterior margin arcuately emarginate for the insertion of the head; base transversely truncate to middle

⁷ Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 131.

of elytron, then turning obliquely backward to the scutellum, in front of which it is arcuately emarginate; surface broadly flattened at the sides, the depression extending obliquely from the anterior angles to the base at middle of the elytron, and then transversely along the base, causing the anterior median part of the disk to be regularly convex, without lateral carina, finely and sparsely punctate on the disk, with large, round, shallow punctures in the flattened areas, sparsely clothed with long, recumbent, fulvous pubescence, with two small spots of denser pubescence at the base, close to the scutellum; intervals obsolete granulated. Scutellum obsolete granulated, broadly triangular, anterior margin rounded. Elytra slightly wider than pronotum at base, widest at basal sixth; humeral angles broadly rounded; sides rounded to basal fourth, then nearly parallel to the middle, and then obliquely attenuate to the tips, which are conjointly rounded, with the lateral margins entire; humeri prominent. Each elytron with a deep broad depression at the base, and a deeper one behind the humerus between the lateral carina and lateral margin, and with a distinct sinuate lateral carina extending from the humeral angle to the apical fourth; with a fine line of blackish hairs (cinereous at the base) extending from the base to the pubescent fascia at middle; the basal half is rather densely clothed with long semierect blackish hairs, with a few cinereous ones behind the scutellum; at the middle there is a well-marked, moderately broad fascia of long semierect cinereous hairs, which extends from the suture to the lateral margin, and behind this fascia is a broader fascia of blackish hairs, similar to those on the basal half; the apical fourth is rather densely clothed with cinereous hairs similar to those on the median fascia; surface finely and densely punctate, the punctures coarser and more widely separated on the sides and humeral region, and finely granulated; intervals nearly smooth. Abdomen beneath moderately convex, sparsely punctate, the punctures large, nearly obsolete, and open on the one side, from each one arises a short recumbent cinereous hair; intervals finely and densely granulated; last segment broadly rounded at the apex, with the margin entire.

Female.—Differs from the male in having the pubescence on the side of pronotum cinereous, humeral regions of elytra not quite so violaceous and more rugose, head cupreous, sparsely pubescent on the occiput, becoming nearly glabrous anteriorly, and without the dense pubescence behind the epistoma.

Length, 2.6–3.4 mm.; width, 1.25–1.7 mm.

Type locality.—Porto Bello, Panama.

Other localities.—Paraiso and Tavernilla, Canal Zone, Panama; Trinidad River and Buena Ventura, Panama.

Type, allotype, and paratypes.—Cat. No. 25111, U.S.N.M.

Described from 15 specimens, 5 males and 10 females.

The type and allotype were collected by E. A. Schwarz at the type locality February 16 and 25, 1911. Five paratypes collected by E. A. Schwarz at Paraiso, Canal Zone, Panama, between January 19 and April 11, 1911; one collected by A. H. Jennings at Paraiso, Canal Zone, Panama, March 28, 1911. August Busck also collected the following paratypes: Four at Paraiso, during January and February, 1911, one at Tavernilla, April 27, 1907, all in the Canal Zone, Panama; one specimen at Buena Ventura, March 10, 1911, and another specimen at Trinidad River, May 4, 1911, both in Panama.

BRACHYS CUPRIFRONS, new species.

Female.—Broadly cuneiform, distinctly longer than wide, broadly rounded in front, slightly narrower behind than in front, moderately shining and sparsely pubescent; head cupreous, becoming reddish on the occiput; pronotum bluish-green, with the sides and anterior margin reddish; scutellum and elytra bluish-green, the latter becoming strongly cyaneous at the humeral areas; beneath piceous.

Head feebly convex, longitudinally grooved from occiput to epistoma, the groove rather broad and deep on the front, becoming obsolete on the occiput; surface with a few shallow, irregular punctures, the punctures more numerous behind the epistoma, but becoming obsolete toward the occiput, very sparsely clothed with short, inconspicuous, recumbent, cinereous hairs; intervals rather densely granulated behind the epistoma, but becoming smoother posteriorly; epistoma wide between the antennal cavities, surface concave and not transversely carinate in front. Pronotum strongly convex, three times as wide as long at the middle, distinctly narrower in front than behind, widest at base; sides arcuately attenuate from base to anterior angles; anterior margin arcuately emarginate, with a broad, obsolete median lobe; base transversely truncate to the elytral lobe, then turning obliquely backward to the scutellum, in front of which it is arcuately emarginate; posterior angles nearly rectangular; surface feebly depressed along base at middle, and with an obsolete depression extending obliquely backward from the anterior angles to the median part, without a lateral carina, finely, irregularly, and sparsely punctate, and very sparsely clothed with rather long, recumbent, cinereous hairs; intervals finely and densely granulated. Scutellum nearly smooth, broadly triangular, sides and anterior margin feebly rounded. Elytra slightly wider than pronotum at base, widest at basal fourth; humeral angles obtusely angulated; sides feebly rounded to middle, then strongly, obliquely attenuate to the tips, which are conjointly, broadly rounded, the lateral margins obsoletely serrate toward the apex; humeri prominent; each clytron with a deep, rather broad depression at the base, a distinct lateral carina, which is strongly sinuate behind the humerus, and extending from

the humeral angle to near the apex, and with two obsolete costae on the disk; surface finely and rather densely punctate, with a few larger punctures toward the base and sides, the basal half is sparsely clothed with long, recumbent, blackish hairs (with a few cinereous ones intermixed); at the middle there is a broad irregular fascia of cinereous hairs, and a similar fascia at the apical fourth; between the two fasciae and the apical fifth the surface is rather densely clothed with long, recumbent, black hairs; intervals smooth. Abdomen beneath strongly convex, sparsely punctate, the punctures large, obsolete, and open on the one side, sparsely clothed with rather long, recumbent cinereous hairs; intervals finely and densely granulated; last segment broadly rounded at the apex, with a series of short, round teeth along the margin.

Length, 4.25 mm.; width, 2.3 mm.

Type locality.—Trinidad River, Panama.

Type.—Cat. No. 25112, U.S.N.M.

Described from a unique female collected by August Busck March 21, 1912.

BRACHYS PILOSUS, new species.

Male.—Broadly cuneiform, distinctly longer than wide, broadly rounded in front, slightly narrower behind than in front, moderately shining and pubescent, uniformly brown, with a strong aeneous tinge; beneath piceous.

Head transversely flattened behind the epistoma, with two smooth feeble gibbosities on the vertex, rather broadly, longitudinally grooved from occiput to the flattened area on front, the groove rather deep on the vertex, but becoming nearly obsolete posteriorly; surface coarsely and densely punctured on the flattened area behind the epistoma, the punctures finer and more widely separated on the occiput, and becoming obsolete on the gibbosities, clothed with rather long pale-yellow pubescence, the pubescence dense and erect behind the epistoma, becoming sparser and recumbent posteriorly, and obsolete on the gibbosities; intervals finely, densely, and obsoletely granulated; epistoma narrow between the antennal cavities, surface flat, with a feebly transverse carina near the anterior margin. Pronotum moderately convex, about two times as wide as long at middle, distinctly narrower in front than behind, widest at base; sides arcuately attenuate from base to anterior angles; anterior margin nearly truncate; base transversely truncate to middle of elytron, then turning obliquely backward to the scutellum, in front of which it is feebly, arcuately emarginate; posterior angles nearly rectangular; surface broadly flattened at the sides, the depression extending obliquely from the anterior angles to the base at middle of the elytron, and then transversely along the base, causing the

anterior median part of the disk to be regularly convex; there is a distinct straight carina on each side in the flattened area, which does not reach the base, nor anterior margin, finely and sparsely punctate on the disk, with large, round, shallow punctures in the flattened areas, sparsely clothed with long, recumbent, pale-yellow hairs (with a few fulvous ones intermixed); intervals obsoletely granulated. Scutellum finely granulated, triangular, anterior margin rounded. Elytra distinctly narrower than the pronotum at base; humeral angles broadly rounded; sides nearly parallel to the middle (feebly sinuate at the basal fourth), then obliquely attenuate to the tips, which are conjointly broadly rounded, with the lateral margins entire; humeri moderately prominent. Each elytron with a broad, deep depression at the base, and a deeper one behind the humerus between the lateral carina and lateral margin, and with a distinct sinuate lateral carina extending from the humeral angle to near the apex; with two fine lines of fulvous hairs extending from the base to near the middle; the basal two-thirds is irregularly and sparsely clothed with rather long, recumbent, pale-yellow hairs (with a few fulvous ones intermixed), leaving a small bare space at the suture, just in front of the middle; behind this there is a rather broad fascia of semierect fulvous hairs, with the margins very irregular; apical fourth sparsely clothed with rather long, recumbent, pale-yellow hairs, inclosing three small, round spots of fulvous hairs, two placed transversely at the middle, and the other one at the apex; surface finely and rather densely punctate, with a few stelliform punctures along the lateral carina; intervals nearly smooth. Abdomen beneath moderately convex, sparsely punctate, the punctures large, shallow, and open on the one side, and from each puncture arises a rather long, recumbent, cinereous hair; intervals finely and densely granulated; last segment broadly rounded at apex, with the margin entire.

Length, 2.75 mm.; width, 1.4 mm.

Type locality.—Ancon, Canal Zone, Panama.

Type.—Cat. No. 25113, U.S.N.M.

Described from a unique male collected by E. A. Schwarz May 5, 1911.

BRACHYS NIGROVIRIDIS, new species.

Male.—Broadly cuneiform, distinctly longer than wide, broadly rounded in front, narrower behind than in front, moderately shining, and sparsely pubescent, uniformly piceous above, with a slight greenish tinge on the elytra; beneath piceous.

Head feebly convex, broadly and deeply, longitudinally grooved from occiput to epistoma, the groove becoming more shallow on the occiput; surface densely and coarsely granulated, with a few inconspicuous punctures intermixed, sparsely clothed with short, recumbent, cinereous hairs behind the epistoma, along the eyes, and on the

occiput; epistoma narrow between the antennal cavities, surface longitudinally concave, and with a strong, transverse carina near the anterior margin. Pronotum moderately convex, about two and one-half times as wide as long at middle, distinctly narrower in front than behind, widest at the base; sides obliquely attenuate from base to anterior angles; anterior margin nearly truncate; base transversely truncate to middle of elytron, then turning obliquely backward to the scutellum, in front of which it is arcuately emarginate; posterior angles nearly rectangular; surface broadly depressed at the sides, the depression extending obliquely from the anterior angles to the base at middle of the elytron, then transversely along the base, causing the anterior median part of the disk to be regularly convex; there is a distinct, short, straight carina on each side in the depressed area, which does not reach the base nor anterior margin, finely and sparsely punctate on the disk with large, round, shallow punctures in the depressed areas, sparsely clothed with rather long, recumbent, cinereous hairs; intervals finely and densely granulated. Scutellum finely granulated, broadly triangular, anterior margin rounded. Elytra slightly narrower than the pronotum at base; humeral angles obtusely angulated; sides nearly parallel to the middle (feebly sinuate at the basal fourth), then obliquely attenuate to the tips, which are separately rounded, with the lateral margins entire; humeri moderately prominent. Each elytron with a broad, rather deep depression at the base, and a shallow one behind the humerus between the lateral carina and the lateral margin, and with a distinct lateral carina extending from the humeral angle to near the apex; with four fine lines of dark-brown hairs, extending from the base to near the apex, one along the suture, two on the disk, and the fourth along the lateral carina; the basal third nearly glabrous, with a few cinereous and fulvous hairs intermixed; just behind the middle there is a narrow fascia of rather long, cinereous hairs (with a few yellowish ones intermixed), and with a small spot of cinereous pubescence between the third and fourth longitudinal lines of brownish hairs, which is connected posteriorly to the median fascia; behind this fascia is an equally wide transverse glabrous space, and at the apical fourth a triangular spot of cinereous pubescence, which extends to the lateral carina; apex with a few short, recumbent, cinereous hairs; surface finely and rather densely punctured in the pubescent spaces, with a series of stelliform punctures on each side of the longitudinal lines of hairs; intervals smooth. Abdomen beneath moderately convex, sparsely punctate, the punctures large, shallow, and open on the one side, and from each puncture arises a rather long, recumbent, cinereous hair; intervals finely and densely granulated; last segment narrowly rounded posteriorly, with the margin feebly emarginate at apex, and very finely dentate.

Length, 2.9 mm.; width, 1.4 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type.—Cat. No. 25114, U.S.N.M.

Described from a single male collected by E. A. Schwarz March 16, 1911.

BRACHYS ANTHRENOIDES Waterhouse.

Brachys anthrenoides WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 132.

The species was described from Bugaba, Volcan de Chiriqui, 3,000 to 4,000 feet, and Taboga Island, all from Panama, without designating any definite type locality. It is represented in the National Museum Collection by four specimens, which are probably paratypes, received from F. D. Godman and labeled "Taboga Isl., Panama. Champion." Besides these four specimens, the National Collection also contains the following: Six specimens collected at Paraiso, Canal Zone, Panama, between January 19 and April 6, 1911, by E. A. Schwarz; another specimen collected in Old Panama, January 31, 1911, by the same collector; two collected at Paraiso, Canal Zone, Panama, April 10 and March 28, 1911, by A. H. Jennings; and two other specimens collected on Taboga Island, Panama, February 23, 1911, by August Busck.

BRACHYS CONFUSUS, new species.

Male.—Broadly cuneiform, distinctly longer than wide, broadly rounded in front, narrower behind than in front, subopaque and rather densely pubescent; head aeneo-viridis in front; pronotum, scutellum, and elytra piceous, with a slight bluish and violaceous tinge on the top, becoming strongly cupreous at the sides; beneath piceous, with a strong aeneous reflection.

Head nearly flat, broadly, longitudinally grooved from epistoma to occiput, the groove rather deep behind the epistoma, but becoming obsolete on the occiput: surface finely, densely granulated and finely punctate, clothed with long, recumbent, cinereous pubescence, which is much denser behind the epistoma; epistoma narrow between the antennal cavities, surface longitudinally concave, with a strong transverse carina near the anterior margin. Pronotum moderately convex, two and one-half times as wide as long at middle, distinctly narrower in front than behind, widest at base; sides arcuately attenuate from base to anterior angles; anterior margin nearly truncate; base transversely truncate to middle of elytron, then turning obliquely backward to the scutellum, in front of which it is arcuately emarginate; posterior angles nearly rectangular; surface broadly depressed at the sides, the depression extending obliquely from the anterior angles to the base at middle of elytron, then transversely along the base, causing the anterior median part of the disk to be regularly

convex; there is a distinct sinuate carina on each side in the depressed area, which does not quite reach the base nor anterior margin, finely and sparsely punctate on the disk, with large, round, shallow punctures in the depressed areas, rather densely clothed with long, recumbent, pale-yellow hairs, with two small spots of denser pubescence at the base, close to the scutellum; intervals obsolete granulated. Scutellum nearly smooth, broadly triangular, anterior margin rounded. Elytra as wide as pronotum at base; humeral angles obtusely angulated; sides nearly parallel to the middle (feebly sinuate at the basal fourth), then obliquely attenuate to the tips, which are conjointly broadly rounded, with the lateral margins entire; humeri moderately prominent. Each elytron with a broad, shallow depression at the base, and a similar shallow one behind the humerus between the lateral carina and lateral margin, and with a distinct lateral carina, which is strongly sinuate at the humerus and extending from the humeral angle to near the apex; surface very uneven on the basal half, becoming smoother posteriorly, with a fine line of pale-yellow hairs extending from the base to the middle, sparsely clothed with long, recumbent, pale-yellow pubescence, but not forming any distinct markings, there are two obsolete spots of erect fulvous hairs on the apical fourth, close to the suture, sparsely and rather finely punctate, the punctures coarser toward the base; intervals finely and densely granulated. Abdomen beneath rather densely punctate, the punctures large, shallow, open on the one side, and from each puncture arises a rather long, recumbent, cinereous hair; intervals finely and densely granulated; last segment broadly rounded at the apex, with the margin very finely dentate.

Length, 2.9 mm.; width, 1.4 mm.

Type locality.—Trece Aguas, Alta Vera Paz, Guatemala.

Type.—Cat. No. 25115, U.S.N.M.

Described from a unique male collected by E. A. Schwarz and H. S. Barber May 4, 1906.

BRACHYS DISTINCTUS Waterhouse.

Brachys distinctus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 132-133.

This species was described from San Isidro, Guatemala, and the type, which is in the British Museum, has not been examined. The species has been placed in the key solely upon the characters given in the original description.

BRACHYS LAETUS Waterhouse.

Brachys laetus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 134.

This species was described from specimens collected at Bugaba and Volcan de Chiriqui, Panama. The type is in the British Museum

and has not been examined. In the National Museum Collection there is a single specimen collected at Paraiso, Canal Zone, Panama, March 20, 1911, by E. A. Schwarz, which agrees with the description given for this species with the exception that the lateral carina is not quite as close to the margin, and the median fascia is not very distinct. The specimen has a strong violaceous tinge on the elytra, especially along the sides behind the middle, in which respect it agrees with the specimen described from Bugaba, but the abdominal segment is subtruncate at the apex, and armed with series of distinct, short teeth, and is probably a female.

BRACHYS ELEGANS, new species.

Male.—Elongate, distinctly longer than wide, broadly rounded in front, nearly as wide behind as in front, strongly shining, and the elytra ornated with distinct pubescent designs; head aeneous in front, becoming violaceous on the occiput; pronotum, scutellum, and elytra piceous and strongly violaceous; beneath piceous.

Head nearly flat, broadly, longitudinally grooved from occiput to epistoma, the groove rather shallow and becoming obsolete on the occiput; surface finely and rather densely punctured on the front, the punctures becoming more widely separated posteriorly, densely clothed with long, semierect, golden pubescence on the front, the pubescence sparser and more recumbent toward the occiput; intervals smooth; epistoma rather wide between the antennal cavities, flat, and not transversely carinate in front. Pronotum moderately convex, two and one-half times as wide as long at middle, distinctly narrower in front than behind, widest at base; sides obliquely attenuate from base to anterior angles; anterior margin feebly, arcuately emarginate; base transversely truncate to middle of elytron, then turning obliquely backward to the scutellum, in front of which it is arcuately emarginate; posterior angles rather acute and projecting slightly beyond the elytra; surface broadly depressed at the sides, the depression extending obliquely from the anterior angles to the base at middle of elytron, then transversely along the base, causing the anterior median part of the disk to be regularly convex; there is a distinct straight carina on each side in the depressed area, which does not reach the base nor anterior margin, finely and sparsely punctate on the disk, with large, round, shallow punctures in the depressed areas, rather sparsely clothed with long, recumbent, cinereous hairs, with two small spots of denser pubescence at the base close to the scutellum; intervals obsoletely granulated. Scutellum obsoletely granulated, triangular, anterior margin rounded. Elytra nearly as wide as pronotum at base; humeral angles obtusely angulated; sides nearly parallel to the middle (strongly sinuate at basal fourth), then arcuately attenuate to the tips, which are conjointly

broadly rounded, with the lateral margins entire; humeri prominent. Each elytron with a broad, shallow depression at the base, and a deeper one behind the humerus between the lateral carina and lateral margin, and with a distinct lateral carina, which is sinuate and strongly elevated at the humerus, and extending from the humeral angle to near the apex; with two fine lines of dark-brown hairs (the external one more obsolete) extending from the base to the middle; the basal third is sparsely clothed with recumbent, blackish hairs, the space near the scutellum (between the suture and pubescent line) is clothed with cinereous hairs and bordered behind by fulvous hairs; at a short distance from the base, between the first and second pubescent lines, there is a small spot of cinereous pubescence; at the middle there is a well-marked, moderately broad fascia of recumbent, cinereous hairs, inclosing a small, round, dark spot situated between the second pubescent line and the lateral carina; the fascia has the margins irregular and extends from the first pubescent line to the lateral margin; close to the suture and slightly posterior to the fascia is a small spot of fulvous hairs bordered posteriorly by cinereous hairs; behind the median fascia there is a broad, transverse space sparsely clothed with semierect, black hairs; and the apical fifth is clothed with recumbent, cinereous pubescence, inclosing a round, dark, spot; sparsely and rather finely punctate, with a series of coarser punctures on each side of the pubescent lines; intervals nearly smooth. Abdomen beneath rather densely punctate, the punctures large, shallow, open on the one side, and from each puncture arises a rather long, recumbent, cinereous hair; intervals smooth, becoming obsoletely granulated on the last segment, which is broadly rounded posteriorly and very finely dentate at the apex.

Length, 3.1 mm.; width, 1.6 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type.—Cat. No. 25116, U.S.N.M.

Described from a single male specimen collected by E. A. Schwarz February 11, 1911.

BRACHYS ORNATUS, new species.

Male.—Elongate, distinctly longer than wide, broadly rounded in front, slightly narrower behind than in front, moderately shining, and the elytra ornated with distinct transverse pubescent fasciae; head slightly aeneous in front, becoming slightly cupreous on the occiput; pronotum, scutellum, and elytra piceous, with a strong, cupreous and greenish reflection; beneath piceous, with a strong aeneous reflection.

Head nearly flat, broadly, longitudinally grooved from epistoma to occiput, the groove quite deep on the front and vertex, and becoming more obsolete near the epistoma and on the occiput; surface finely and rather densely punctate, the punctures becoming more

widely separated posteriorly, rather sparsely clothed with long, recumbent, dark and light yellow hairs intermixed; intervals obsoletely granulated; epistoma rather wide between the antennal cavities, flat and not transversely carinate in front. Pronotum moderately convex, two times as wide as long at middle, distinctly narrower in front than behind, widest at base; sides obliquely attenuate from base to anterior angles; anterior margin nearly truncate; base transversely truncate to middle of elytron, then turning obliquely backward to the scutellum, in front of which it is arcuately emarginate; posterior angles rounded; surface broadly depressed at the sides, the depression extending obliquely from the anterior angles to the base at middle of elytron, then transversely along the base, causing the anterior median part of the disk to be regularly convex, there is a distinct straight carina on each side in the depressed area, which does not reach the base nor anterior margin, finely and sparsely punctate on the disk, with large, round, shallow punctures in the depressed areas, sparsely clothed with long, recumbent, cinereous hairs (with a few fulvous ones here and there) leaving two round, approximate bare spots on the disk, and with two small spots of denser pubescence at the base, close to the scutellum; intervals obsoletely granulated. Scutellum nearly smooth, broadly triangular, anterior margin rounded. Elytra nearly as wide as pronotum at base; humeral angles obtusely angulated; sides nearly parallel to the middle (strongly sinuate at basal fourth), then obliquely attenuate to the tips, which are conjointly broadly rounded, with the lateral margins entire; humeri prominent. Each elytron with a broad, shallow depression at the base, and a deeper one behind the humerus between the lateral carina and lateral margin, with a distinct lateral carina, which is sinuate and strongly elevated at the humerus, broadly depressed at basal third, and extending from the humeral angle to the apex, with four fine lines of fulvous hairs extending from the base to the middle, one along the suture, two on the disk, and the fourth along the lateral carina; basal half nearly glabrous, with a few fulvous hairs between the third pubescent line and the lateral margin and the space near the scutellum (between the suture and second pubescent line) sparsely clothed with fulvous pubescence; at a short distance behind the base, between the second and third pubescent lines, there is a small spot of cinereous hairs; at the middle there is a well-marked, moderately broad fascia of recumbent, cinereous pubescence, inclosing a small patch of fulvous hairs, and extending from the second to the fourth pubescent line; at the posterior margin of this fascia there are two small patches of cinereous hairs, one near the lateral margin and the other close to the suture; behind the median fascia there is a transverse space with a few recumbent, black hairs; the apex is covered with recum-

bent fulvous hairs, inclosing a small, round, dark space, and bordered above with cinereous hairs; finely and rather densely punctured on the pubescent spaces, with a series of stelliform punctures on each side of the pubescent lines; intervals nearly smooth. Abdomen beneath rather densely punctate, the punctures large, shallow, open on the one side, and from each puncture arises a rather long, recumbent, cinereous hair; intervals finely and densely granulated; last segment broadly rounded posteriorly, and very finely dentate at the apex.

Female.—Differs from the male in having the head more convex, more deeply grooved at middle, surface smoother and very sparsely pubescent, the pubescence nearly obsolete on the front, and the abdomen broader and not quite as attenuate posteriorly.

Length, 3–3.2 mm.; width, 1.4–1.5 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type, allotype, and paratypes.—Cat. No. 25117, U.S.N.M.

Described from 10 specimens, 5 males and 5 females, all of which were collected by E. A. Schwarz at the type locality between January 17 and May 12, 1911.

This species is closely allied to *Brachys distinctus* Waterhouse, described from Guatemala. It differs, however, from that species, by having the elytra piceous, with a cupreous, violaceous or greenish, reflection, and not cyaneous as in that species, and the arrangement and color of the pubescent markings on the elytra are different.

BRACHYS PULVEROSUS Waterhouse.

Brachys pulverosus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 138.

This species was described from material collected at Jalapa, Mexico, by C. T. Höge.

It is represented in the National Museum Collection by a single example collected at Tampico, Mexico, December 25, 1909, by E. A. Schwarz. It agrees with the description for this species, with the exception that the two small spots near the scutellum are composed of fulvous hairs instead of white ones, as given in the original description.

Genus LIUS Deyrolle.

Lius H. DEYROLLE, Ann. Soc. Ent. Belg., vol. 8, 1864, p. 219.

Nearly 75 species have been described in this genus, the distribution of which is confined to the Western Hemisphere. Of this number of species only 6 have been previously described from Mexico and Central America, 1 from the Antilles, and the remainder of the species from South America, where this genus attains its highest development. All of the species of this genus are similar in form, somewhat triangular, and strongly attenuate posteriorly, but are rather variable in color.

narrowly rounded, the lateral margins finely serrate; humeri rather prominent; each elytron with an obsolete basal depression, and a very feeble one behind the humeral angle; surface glabrous, sparsely, irregularly, and coarsely punctate, the punctures very shallow and obsolete; intervals smooth. Abdomen beneath sparsely and irregularly punctate, the punctures very shallow and obsolete, sparsely clothed with very short, recumbent, inconspicuous hairs; intervals finely, densely, and obsoletely reticulate-striolate; last segment narrowly rounded at the tip, with a very feebly triangular emargination at the apex, the portion in front of the marginal groove broadly rounded at tip. Metasternum more coarsely punctured, and the intervals smoother at the middle than on the abdomen, and with a deep, elongate emargination at the middle of the anterior margin. Prosternum glabrous, finely and densely granulated, the granulation becoming smoother on the prosternal process; anterior margin nearly truncate; prosternal process parallel, sides carinate, the carinae expanding behind the coxae, and the apex broadly rounded.

Female.—Differs from the male in having the last abdominal segment narrowly rounded at the apex, and armed with 11 rather long teeth, which are slightly bent downward and placed close together; the median tooth is wider, longer, and broadly rounded at apex; balance of teeth narrow, very acute at the apex, and placed obliquely on each side of the median tooth.

Length, 2.5 mm.; width, 1.3 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Other localities.—Pedro Miguel, Canal Zone, Panama.

Type, allotype, and paratype.—Cat. No. 25118, U.S.N.M.

Described from three specimens, two males and one female. The type and allotype were collected by E. A. Schwarz at the type locality, February 5 and 8, 1911; the male paratype was taken by the same collector at Pedro Miguel, Panama, April 17, 1911.

This species is closely allied to *variabilis* Waterhouse, but differs from it in color, by being more convex, head much narrower in front, epistoma very narrow, and the antennae nearly contiguous.

LIUS TIMIDUS Kerremans.

Lius timidus KERREMANS, Ann. Soc. Ent. Belg., vol. 44, 1900, pp. 349-350.

This species was described from Guatemala and has not been seen by the writer. It has been placed in the key solely upon the characters given in the original description.

LIUS ARES Saunders.

Lius ares SAUNDERS, Ent. Monthly Mag., vol. 13, 1876, p. 49.

This species was described from material collected by Bates at Para, Ega, and Santarem, along the Amazon River in Brazil.

Waterhouse (Biol. Centr.-Amer., vol. 3, pt. 1, 1889, p. 135) states that he is unable to separate the specimens collected by Mr. Champion in Panama and Honduras from the type. It is represented in the National Museum Collection by three specimens received from F. D. Godman and labeled as follows: "Bugaba, Panama, Champion" and "Volcan de Chiriqui, 25-4000 feet. Champion."

LIUS MEXICANUS, new species.

Male.—Elongate, broadly cuneiform, moderately convex and feebly flattened on top, strongly attenuate posteriorly, shining, and uniformly aeneous above and beneath, with a slight cupreous tinge.

Head feebly convex, broadly and deeply depressed on the front, the depression becoming obsolete on posterior part of occiput, with a narrow, deep, longitudinal groove, extending from the occiput to the epistoma, posterior to which the groove is broadly triangular and flattened, the sides arcuately rounded; front wide, about two times as wide as the transverse diameter of the eye; surface sparsely punctate, the punctures very shallow and obsolete, sparsely clothed with short, recumbent, inconspicuous hairs; intervals finely, densely, and obsoletely reticulate-striolate posteriorly, becoming smooth on the triangular area behind the epistoma; eyes flattened; epistoma wide, the antennae widely separated. Pronotum feebly convex, nearly three times as wide as long at base, distinctly narrower in front than behind, widest at base; sides when viewed from above are parallel at base for a very short distance, then strongly, obliquely attenuate to the anterior angles; posterior angles obtusely rounded and feebly projecting; anterior margin feebly sinuate; base feebly sinuate to beyond middle of elytron, then turning obliquely backward to the scutellum, in front of which it is truncate; surface with an obsolete longitudinal groove at middle, sparsely, coarsely, and distinctly punctate, and sparsely clothed with short, recumbent, inconspicuous hairs; intervals finely and obsoletely reticulate-striolate. Scutellum triangular; anterior margin truncate; surface smooth. Elytra moderately convex, slightly flattened on the top, as wide as pronotum at base: humeral angles obtusely angulated; sides nearly parallel to basal third, then strongly, arcuately attenuate to the tips, which are separately, narrowly rounded, the lateral margins rather strongly serrate; humeri rather prominent; each elytron with a broad, shallow depression at the base, a very narrow, shallow one behind the humeral angle, a broad, obsolete one behind the humerus, a similar obsolete one along lateral margin just behind the middle, and a broad, obsolete one along the suture at the apical third, which extends narrowly along the suture to the apex; surface wrinkled at the sides, coarsely, irregularly, and rather densely punctate, sparsely clothed with short, recumbent, inconspicuous hairs; intervals smooth

on the disk, becoming finely granulated at the sides. Abdomen beneath sparsely and irregularly punctate, the punctures very shallow and obsolete, sparsely clothed with rather long, recumbent, cinereous hairs which are slightly longer on the last segment; intervals finely, densely, and obsoletely reticulate-striolate; last segment narrowly rounded at tip, with a small triangular emargination at the apex. Metasternum more coarsely punctured, and the intervals smoother at the middle than on the abdomen, and with a deep, elongate emargination at the middle of the anterior margin. Prosternum finely and densely granulated, and with a few inconspicuous hairs; anterior margin broadly rounded; posternal process narrow, nearly parallel, sides carinate, the carinae parallel, and the apex broadly rounded.

Length, 3.25 mm.; width, 1.6 mm.

Type locality.—Tepic, Mexico.

Type.—Cat. No. 25119, U.S.N.M.

Described from a single male specimen collected by Gustav Eisen and labeled "U.S.N.M. Acc. 31016."

This species is closely allied to *ares* Saunders, but differs from it in being entirely aeneous, pronotum obsoletely, longitudinally grooved at middle, eyes flat, scutellum longer, head more densely punctured, and the last abdominal segment of the male more deeply emarginate.

LIUS DISSIMILIS Waterhouse.

Lius dissimilis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 135-136, pl. 7, fig. 18.

Described from material collected by Mr. Champion near Guatemala City, Guatemala, at an elevation of 5,000 feet. The type, which is in the British Museum, has not been examined, and the species has been placed in the key from the characters given in the original description.

LIUS PARVULUS Waterhouse.

Lius parvulus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 136-137.

This species was described from material collected by Mr. Champion at Bugaba, Volcan de Chiriqui, and Taboga Island, Panama, without designating any definite type locality. It is represented in the National Museum Collection by a single specimen, which is probably a paratype, received from F. D. Godman, and labeled "Bugaba, 800-1500 ft. Champion." Besides this specimen the National Museum Collection also contains the following: Seven specimens collected at Paraiso, Canal Zone, Panama, between January 17 and April 6, 1911, by E. A. Schwarz, and another specimen collected at the same locality, April 10, 1911, by A. H. Jennings.

LIUS PARVULUS, var. Waterhouse.

Lius parvulus, var. WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 136-137.

This variety with the head and pronotum cupreous or cupreoneous, is recorded by Waterhouse as occurring with the typical form at Bugaba, Panama, and also from Zapote, Guatemala, but without giving it any varietal name. It differs only slightly from the description given for *Lius amabilis*, described by Kerremans from Mexico, and it is just possible that two forms are identical. It is represented in the National Museum Collection by the following material: Five specimens collected at Paraiso, Canal Zone, Panama, between January 16 and March 18, 1911, by E. A. Schwarz; two others from the same locality collected April 10, 1911, by A. H. Jennings; and another specimen collected at Finca Trece Aguas, Alta Vera Paz, Guatemala, at an altitude of 900 feet, March 30, 1906, by Messrs. Barber and Schwarz.

LIUS VARIABILIS Waterhouse.

Lius variabilis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 136.

This species was described from material collected by Mr. Champion at Chiacam, San Joaquin, and San Geronimo, Guatemala, without designating any definite type locality. It is represented in the National Museum Collection by a single specimen, which may be one of the paratypes, received from F. D. Godman and labeled "S. Gerónimo, 3000 ft. Champion." This species is longer in proportion to its width than any of the other species examined, and is more regularly convex. The color is quite variable, and the specimen in the National Collection has the head, pronotum, and scutellum aeneous, and the elytra of a purplish-coppery color, with a slight greenish tinge on the disk.

LIUS AMABILIS Kerremans.

Lius amabilis KERREMANS, Ann. Soc. Ent. Belg., vol. 40, 1896, pp. 329-330.

Described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. The origin of the specimens collected under these conditions should be verified, as tobacco from Brazil and other localities was stored in the same building. It is placed in the key solely upon the characters given in the original description. From the description given it is closely allied to the variety of *parvulus* with the cupreous pronotum, recorded by Waterhouse from Panama and Guatemala.

Genus TAPHROCERUS Solier.

Taphrocerus SOLIER, Ann. Soc. Ent. France, ser. 1, vol. 2, 1833, pp. 314-315.

The species of this genus are elongate and agriliform, and their distribution is confined to the Western Hemisphere. The genus con-

tains about 42 previously described species, of which 2 are found in the West Indies, 7 in the United States, 11 in Mexico and Central America, and the remainder in South America.

KEY TO THE SPECIES.

1. Elytra with lateral carina 2
Elytra without lateral carina 5
2. Black or greenish species 3
Aeneous species 4
3. Black species; pronotum with lateral carina *nigritulus* Waterhouse.
Bottle-green species; pronotum without lateral carina *albofaciatus* Fisher.
4. Lateral carina sinuate, following the curves of the lateral margin
costatus Waterhouse.
Lateral carina straight for one-half its length, and parallel to the suture
fasciatus Waterhouse.
5. Elytra with pubescent spots 6
Elytra without pubescent spots 9
6. Black species *guttatus* Waterhouse.
Aeneous species 7
7. Robust species, subopaque { *mexicanus* Waterhouse.
leoni Dugès.
Cylindrical species, shining 8
8. Elytra with distinct white pubescent fascia near apex; front of head without transverse pubescent fascia; last abdominal segment with the lateral groove obtusely rounded, following outline of lateral margin, but not reaching it.
psilopteroides Waterhouse.
Elytra without distinct white pubescent fascia at apex, but with apical third sparsely clothed with white hair; front of head with transverse, pubescent fascia; last abdominal segment with the lateral groove angulate, transverse, and reaching to the lateral margin *sulcifrons* Fisher.
9. Pronotum with short, lateral carina *uniformis* Waterhouse.
Pronotum without lateral carina 10
10. Elytral punctures with distinct hairs 11
Elytral punctures without distinct hairs 12
11. Pronotum transversely concave in front of scutellum, surface smooth; last abdominal segment rounded at apex, without concave depression between lateral groove and apical margin *purpureipennis* Waterhouse.
Pronotum not transversely concave in front of scutellum, surface finely granulated; last abdominal segment truncate at apex, with an elongate depression between the lateral groove and apical margin *kerremansi* Dugès.
12. Pronotum widest near middle, sides arcuate, base not as wide as elytra.
communis Waterhouse.
Pronotum widest at base, sides oblique, base wider than the elytra.
attenuatus Fisher.

TAPHROCERUS NIGRITULUS Waterhouse.

Taphrocerus nigritulus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 128.

This species was described from San Miguel in the Pearl Islands, Panama, and the type is in the British Museum. It is represented in the National Museum Collection by two specimens collected at Panama City, Panama, April 23, 1911, by A. H. Jennings.

TAPHROCERUS ALBOFASCIATUS, new species.

Female.—Elongate, strongly attenuate posteriorly, moderately convex and strongly flattened on top, with pubescent spots above, head greenish-bronze, pronotum and elytra bottle-green, with a strong violaceous tinge, scutellum brown; beneath piceous, with a strong aeneous tinge.

Head much narrower than pronotum at base, feebly convex and broadly flattened in front of epistoma, with a rather shallow, longitudinal groove extending from the occiput to the middle of the front, where it is connected to a wide, transverse depression; surface very sparsely, irregularly, and coarsely punctate, the punctures becoming much finer and nearly obsolete on the occiput and near the epistoma, clothed with long, recumbent, cinereous pubescence, the hairs becoming denser in the flattened area in front of epistoma and along the eyes; intervals finely and densely granulated. Pronotum moderately convex, nearly two times as wide as long, considerably narrower in front than behind, widest near the middle; sides when viewed from above are strongly, arcuately rounded to the basal fourth, then parallel to the posterior angles, which are rectangular; anterior margin feebly sinuate, and broadly lobed at middle; base transversely truncate to middle of the elytron, then turning obliquely backward to the scutellum, in front of which it is feebly arcuately emarginate; surface with a broad, obsolete depression along anterior margin, and a more narrowly obsolete one along the sides, obsoletely concave in front of scutellum, with a large transverse depression on each side, which is prolonged obliquely toward the anterior angles, these depressions cause the anterior part of the disk to be rather strongly convex, and with a rather broad gibbosity on each side near the posterior angles, with large shallow punctures placed rather closely in the depression, from the center of each arises a rather long, recumbent, yellowish hair; intervals and convex areas finely and densely granulated. Scutellum triangular, obsoletely reticulate, feebly rounded in front. Elytra feebly convex, strongly flattened on top, wider than pronotum at base; humeral angles obtusely angulated; sides strongly arcuately concave from the humeral angles to the middle, where they are broadly rounded and slightly wider than at the base, then rather strongly attenuate to the tips, which are separately, broadly rounded, and obsoletely serrate; humeri well developed; each elytron with a broad, moderately deep basal depression, and with a very distinct lateral carina extending from the humerus to near the apex, but not quite reaching it, the carina strongly sinuate and following the curves of the sides of the elytron; surface with several rows of coarse, shallow punctures, the rows varying somewhat in length, but not extending beyond the middle, the pubescent areas are finely and densely punc-

tate; intervals finely rugose anteriorly, becoming much smoother toward the apex; each elytron ornated with two transverse fasciae, composed of rather densely placed, long, recumbent, cinereous pubescence as follows: A wide, irregular one at the middle, and the other covering the apical sixth; there is also a broad, irregular area of pubescence of the same color behind the scutellum, which is connected to the middle fascia by a narrow, longitudinal fascia at the middle, the surface between the fasciae is also densely clothed with erect, inconspicuous, black hairs. Abdomen beneath moderately convex, sparsely and rather coarsely punctate, the punctures shallow, rounded, and open on the one side, clothed with long, recumbent, inereous hairs, the pubescence very sparse on the median parts, becoming much denser toward the sides; intervals finely and densely reticulate; last segment somewhat flattened, and broadly rounded at apex, with the apical groove broadly truncate at tip. Metasternum more densely punctured than abdomen, and sparsely pubescent. Prosternum finely and densely rugose.

Length, 4 mm.; width, 1.5 mm.

Type locality.—Alhajuelo, Panama.

Type.—Cat. No. 25120, U.S.N.M.

Described from a single female specimen collected by August Busck, April 5, 1911. This beautiful insect belongs to the group of species which have a distinct lateral carina on the elytron, and can be easily distinguished from the other species of this group by the color of the elytra, which is bottle-green, with a strong violaceous tinge.

TAPHROCERUS COSTATUS Waterhouse.

Taphrocerus costatus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 127-128.

This species was described from Cordoba, Mexico, and Caban in Vera Paz, Guatemala, and the type, which is in the British Museum, has not been examined. The species has been placed in the key solely upon the characters given in the original description.

TAPHROCERUS FASCIATUS Waterhouse.

Taphrocerus fasciatus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 128.

The type locality for this species is Caldera in Chiriqui, Panama, at an elevation of 1,200 feet. The type is in the British Museum and has not been examined. It is placed in the key from the characters given in the original description.

TAPHROCERUS GUTTATUS Waterhouse.

Taphrocerus guttatus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 129.

This species was described from San Juan in Vera Paz, Guatemala, and the type, which is in the British Museum, has not been examined. This species has also been reported from Panama, and is represented in the National Museum Collection by a single example collected at Livingston, Guatemala, May 11, 1906, by Barber and Schwarz.

TAPHROCERUS MEXICANUS Waterhouse.

Taphrocerus mexicanus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 128-129.

This species was described from material collected in a number of localities in Mexico and Guatemala, without giving any definite type locality. The type is in the British Museum and has not been examined. There is only one specimen in the National Museum Collection which would apply to this species, but for the present is retained under the following species, which is probably a synonym.

TAPHROCERUS LEONI Dugès.

Taphrocerus leoni DUGÈS, La Naturelleza, ser. 2, vol. 2, 1891, p. 35, pl. 2, fig. 61, 61a.

This species was described from Tupataro, State of Guanajuato, Mexico, and the location of the type is unknown to the writer. There is a specimen in the National Museum Collection, which was received for determination from Eugenio Dugès a number of years previous to the publication of his description of *Taphrocerus leoni*, and labeled in his own handwriting, "No. 562, *Brachys albosignatus* E. Dugès," without any locality given. This is probably a manuscript name of Dugès, and no published description of it can be found. This specimen probably was taken from a set, from which he described this species a few years later. Waterhouse described his *Taphrocerus mexicanus* from a series of specimens, including material from Sallé, which is from the same locality as *leoni* described by Dugès. In carefully comparing the descriptions, I can not find sufficient characters for separating the two species, and probably *Taphrocerus leoni* Dugès is a synonym of *Taphrocerus mexicanus* Waterhouse.

A specimen received from Prof. H. F. Wickham, which was collected by himself at Tepehuane, Durango, Mexico, differs slightly from the specimen from Tupataro by being slightly more slender and brassy, the pubescent spots not quite as distinct, but the brassy punctured areas are present, which indicates that the surface has been denuded of some of the pubescence.

TAPHROCERUS PSILOPTEROIDES Waterhouse.

Taphrocerus psilopteroides WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 129.

This species was described from Chiacam, Guatemala, and the type is in the British Museum. It has been reported also from Mexico and Panama by Waterhouse, and is represented in the National Museum Collection by three examples; one collected at Paraiso, Canal Zone, Panama, January 26, 1911, by E. A. Schwarz; one collected at La Ceiba, Honduras, August 15, 1916, by F. J. Dyer; and another specimen swept from grass and cowpeas at Juan Mina plantation, Canal Zone, Panama, July 13, 1918, by H. F. Dietz and J. Zetek.

TAPHROCERUS SULCIFRONS, new species.

Male.—Elongate, attenuate posteriorly, subcylindrical, uniformly brownish, with a strong aeneous tinge, and with pubescent spots above; beneath of the same color as above.

Head nearly as wide as pronotum at base, feebly convex and broadly flattened behind the epistoma, causing two feeble, smooth gibbosities on the front, with a longitudinal groove extending from the occiput to near the epistoma, the groove obsolete on the occiput, but becoming deeper on the vertex and front; surface sparsely, irregularly, and coarsely punctate, the punctures very shallow and obsolete on the occiput, and much finer and denser on the flattened area behind the epistoma, sparsely clothed with short, inconspicuous hairs, except along the epistoma, where the pubescence is longer and much denser; intervals finely and densely granulated. Pronotum moderately convex, one and two-thirds times as wide as long, slightly narrower in front than behind, widest at the base; sides when viewed from above feebly, obliquely dilated to the posterior angles, which are rather obtuse; anterior margin truncate; base transversely truncate to middle of elytron, then turning obliquely backward to the scutellum, in front of which it is feebly, arcuately emarginate; surface with a broad obsolete depression along the anterior margin, and a more narrow, obsolete one along the sides, broadly concave in front of scutellum, the concavity extending on each side into a deep depression, which is prolonged obliquely toward the anterior angles, these depressions cause the surface to be broadly gibbose on the median anterior part, and a small gibbosity on each side near the posterior angles, sparsely, irregularly punctate, the punctures very shallow and somewhat denser in the depressions, sparsely clothed with short, recumbent, cinereous hairs; intervals finely and densely granulated. Scutellum triangular, obsoletely reticulate, feebly rounded in front. Elytra rather strongly convex, slightly narrower than pronotum at base; humeral angles rather obtusely angulated; sides rather strongly sinuate behind the humeri, as wide at the middle as at the humeral

angles, strongly attenuate from the middle to the apex, which is conjointly broadly rounded, and obsoletely serrate; humeri well developed; each elytron with a deep, rather broad basal depression, and without lateral carina; surface with rows of punctures which are large at the base, but gradually becoming smaller toward the apex, where they are not very distinct, with an obsolete broken, transverse fascia at middle, and the entire apical third very sparsely clothed with rather long, recumbent, cinereous hairs; there are also a few scattered hairs of the same color behind the scutellum; intervals shining and coarsely rugose anteriorly, becoming finely and densely granulated at apex. Abdomen beneath moderately convex, sparsely and obsoletely punctate, the punctures shallow, oblong, and open on the one side, each puncture bearing a short, recumbent hair; intervals finely and densely reticulate; last segment broadly rounded at apex, with the apical groove broadly angulated at middle. Metasternum more coarsely and distinctly punctured than the abdomen. Prosternum finely and densely rugose.

Length, 3 mm.; width, 1 mm.

Type locality.—Juan Mina, Canal Zone, Panama.

Type.—Cat. No. 25121, U.S.N.M.

Described from a single male specimen collected by J. Zetek February 18, 1921. This species resembles *T. attenuatus* Fisher in form and color, but is not as strongly attenuate posteriorly, and the elytra is ornated with transverse pubescent fasciae.

TAPHROCERUS UNIFORMIS Waterhouse.

Taphrocerus uniformis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 130.

This species was described from specimens collected near Mexico City, Mexico, and the type, which is in the British Museum, has not been examined. The species has been placed in the key solely upon the character given in the original description.

TAPHROCERUS PURPUREIPENNIS Waterhouse.

Taphrocerus purpureipennis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 129-130.

This species was described from material collected on Taboga Island, Panama, by Mr. Champion. It is represented in the National Museum Collection by the following material: One specimen collected at Paraiso, Canal Zone, Panama, April 19, 1911, by E. A. Schwarz; one collected at Juan Mina, Canal Zone, Panama, February 18, 1921, by J. Zetek; and two other specimens collected at Finca Trece Aguas, Alta Vera Paz, Guatemala, at an altitude of 900 feet, March 26 and April 15, 1906, by Barber and Schwarz. The specimens from Guatemala are not quite as broad as those from Panama, and have the head a little more deeply grooved.

TAPHROCERUS KERREMANSI Dugès.

Taphrocerus kerremansi DUGÈS, La Natureza, ser. 2, vol. 2, 1891, pp. 35-36, pl. 2, figs. 62, 62a.

This species was described from material collected at Tupataro, Mexico. There is a specimen in the National Museum Collection, collected at Tampico, Mexico, December 6, by F. C. Bishopp, which agrees very well with the description given by Dugès for this species.

TAPHROCERUS COMMUNIS Waterhouse.

Taphrocerus communis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 130.

The type locality of this species is Atoyac in Vera Cruz, Mexico, and the type, which is in the British Museum, has not been examined. It has been reported also by Waterhouse from Guatemala and Panama, and varies somewhat in color and form. It is represented in the National Museum Collection by the following material: Two specimens from La Ceiba, Honduras, collected November 29, 1916, by F. J. Dyer; two from Paraiso, Canal Zone, Panama, April 19 and January 26, 1911, and one from Porto Bello, Panama, February 15, 1911, all collected by E. A. Schwarz; one from Panama City, Panama, April 15, 1911, collected by A. H. Jennings; two from Corozal, Canal Zone, March, 1912, one from Paraiso, Canal Zone, January 19, 1911, and another specimen from Taboga Island, February 26, 1912, all from Panama and collected by August Busck; one from Minatitlan, Mexico, February 1, 1892, collected by H. Osborn; and another specimen collected by J. Zetek at Juan Mina, Canal Zone, Panama, on February 18, 1921.

TAPHROCERUS ATTENUATUS, new species.

Male.—Elongate, strongly attenuate posteriorly, subcylindrical uniformly piceous above, with a strong aeneous tinge, and without pubescent spots; beneath slightly darker than above.

Head slightly narrower than pronotum at base, feebly convex, with a longitudinal groove extending from the occiput to the epistoma, the groove quite deep on the front and becoming obsolete on the occiput; surface with a few irregular, coarse, and very shallow punctures, and clothed with a few inconspicuous hairs; intervals very finely reticulate, becoming nearly smooth on the front. Pronotum moderately convex, one and one-half times as wide as long, slightly narrower in front than behind, widest at base; sides when viewed from above feebly, obliquely dilated to the basal sixth, then parallel to the posterior angles, which are rectangular and feebly projecting beyond the humeral angles of the elytra; anterior margin truncate; base transversely truncate to middle of elytron, then turned obliquely backward to the scutellum, in front of which it is feebly, arcuately

emarginate; surface with a broad, obsolete depression along anterior margin, and with the sides broadly depressed, the depression becoming obliquely broader posteriorly, and broadly concave along the base, causing the median anterior part of disk to be strongly convex, sparsely, irregularly punctate, the punctures very shallow, obsolete, and from the center of which arises a very short, inconspicuous, cinereous hair; intervals finely and densely reticulate. Scutellum triangular, obsoletely reticulate, feebly rounded in front. Elytra rather strongly convex, slightly narrower than pronotum at base; humeral angles rather obtusely angulated; sides rather strongly sinuate behind the humeri, as wide at the middle as at the humeral angles, strongly, obliquely attenuate from the middle to the apex, which is conjointly, broadly rounded, and obsoletely serrate; humeri well developed; each elytron with a deep, rather broad basal depression, and without lateral carina; surface with rows of large, shallow punctures, which are less impressed toward the apex, the rows somewhat confused near the base, and each puncture bearing a very inconspicuous, cinereous hair; intervals coarsely rugose anteriorly, becoming finely and densely granulate at the apex. Abdomen beneath strongly convex, sparsely and obsoletely punctate, the punctures shallow, oblong, and open on the one side, very sparsely clothed with obsolete, cinereous hairs; intervals finely and densely reticulate; last segment broadly rounded at apex, with the apical groove following the outline of the margin. Metasternum with the surface similar to that of the abdomen. Prosternum finely and densely rugose.

Length, 2.75 mm.; width, 1. mm.

Type locality.—Panama City, Panama.

Type and paratype.—Cat. No. 25122, U.S.N.M.

Described from two male specimens collected by A. H. Jennings April 23, 1911. This species resembles *T. communis* Waterhouse very closely, but can be distinguished from that species by the pronotum being widest at the base and the elytra not quite as wide as the pronotum.

Genus CALLIMICRA Deyrolle.

Callimicra H. DEYROLLE, Ann. Soc. Ent. Belg., vol. 8, 1864, p. 219.

This genus contains 29 described species, and their distribution is restricted to Mexico, Central and South America. Of this number, only 6 species have been described from Mexico and Central America, and the remainder of the species from South America.

KEY TO THE SPECIES.

- | | |
|-----------------------------------------|---------------------------|
| 1. Pronotum with a lateral carina | 2 |
| Pronotum without a lateral carina..... | 5 |
| 2. Above unicolorous..... | <i>obtusa</i> Waterhouse. |
| Above bicolorous | 3 |

3. Elytra violaceous..... violaceipennis Waterhouse.
 Elytra cyaneous..... 4
4. Pronotum with sides arcuately attenuate from base to apical angles, and distinctly narrower in front than behind..... lucida Waterhouse.
 Pronotum with sides nearly parallel, and scarcely narrower in front than behind.
 angustula Waterhouse.
5. Each elytron with two or three rows of fine punctures.... dimidiata Waterhouse.
 Punctures on elytron not arranged in rows..... breviscula Waterhouse.

CALLIMICRA OBTUSA Waterhouse.

Callimicra obtusa WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 164.

This species was described from Bugaba, Panama, and the type is in the British Museum. It is represented in the United States National Museum Collection by two specimens collected at Trinidad River, Panama, March 21, 1911, by August Busck, and another specimen collected at La Chorrera, Panama, May 18, 1912, by the same collector. The specimens from Trinidad River have the underside piceous, with exception of the metasternum, which is green. One of the specimens has the front of the head uniformly dark blue, while in the other one it is bronzy. The specimen from La Chorrera differs slightly in being longer, underside entirely piceous, and the last abdominal segment more acutely rounded.

CALLIMICRA VIOLACEIPENNIS Waterhouse.

Callimicra violaceipennis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 165.

This species was described from Playa Vicente, Mexico, and the type, which is in the British Museum, has not been examined. The species has been placed in the key solely upon the characters given in the original description.

CALLIMICRA LUCIDA Waterhouse.

Callimicra lucida WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 165.

This species was described from Bugaba, Panama, and the type is in the British Museum. It is represented in the National Museum Collection by four examples; two collected at La Chorrera, Panama, May 18, 1912, by August Busck; one specimen collected at Paraiso, Canal Zone, Panama, April 29, 1911, by E. A. Schwarz; and the other one at Esparza, Costa Rica, September 18, 1905, by Frederick Knab.

CALLIMICRA ANGUSTULA Waterhouse.

Callimicra angustula WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 166, pl. 9, fig. 10.

This is one of the narrow species of the genus and was described from Tuxtla, Mexico; San Juan in Vera Paz, Guatemala; and Volcan

de Chiriqui, Panama. The type is in the British Museum and has not been examined. It is placed in the key on the basis of the original description.

CALLIMICRA DIMIDIATA Waterhouse.

Callimicra dimidiata WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 164, pl. 9, fig. 9.

This species is much broader than *angustula* and was described from Bugaba, Panama, and the type, which is in the British Museum, has not been examined. It has been placed in the key from the characters given in the original description.

CALLIMICRA BREVIUSCULA Waterhouse.

Callimicra breviuscula WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 165-166.

The type locality of this species is San Miguel del Rio, Orizaba, Mexico. The type is in the British Museum and has not been examined. It is represented in the National Museum Collection by a single example from Mexico, without any definite locality, which was received from L. Conrardt, Colima, State of Colima, Mexico. This specimen differs somewhat in color from the original description by having the disk of pronotum strongly cupreous and the elytra with a slight greenish and violaceous tinge.

Genus LEIOPLEURA Deyrolle.

Leioptleura H. DEYROLLE, Ann. Soc. Ent. Belg., vol. 8, 1864, p. 219.

The genus contains about 85 species, 9 of which are described in the present paper. The species of this genus are oblong or ovate, strongly attenuate posteriorly, and their distribution is confined to the warmer sections of the Western Hemisphere. Of this number of species 1 has been described from Cuba, 38 from Mexico and Central America, and the remainder from South America.

Leioptleura viridicollis, described by Gory from Cayenne, Guiana,⁸ and recorded by Waterhouse from Bugaba, Panama, has been omitted from the key, as it has been impossible to correlate the characters given in the original description with those used in the key.

KEY TO THE SPECIES.

1. Pronotum and elytra unicolored	2
Pronotum and elytra bicolored	9
2. Surface above piceous	3
Surface above aeneous, rufo-cupreo, or purplish	7
3. Head piceous	4
Head aeneous	<i>trivialis</i> Waterhouse.
4. Sides of pronotum narrowly flattened	5
Sides of pronotum broadly flattened	6

⁸ Mon. Bupr. Suppl., vol. 4, 1841, p. 343, pl. 58, fig. 339.

5. Narrow species, not two times as wide as long; pronotum with a deep depression near posterior angles, where the surface is obsoletely rugose, the sides distinctly margined *minuta* Kerremans.
 Broader species, more than two times as wide as long; pronotum without a deep depression near posterior angles, where the surface is strongly rugose, the sides obsoletely margined..... *nigra* Waterhouse.
6. Pronotum with the disk regularly convex *crassa*, var. Waterhouse.
 Pronotum with two lunate depressions on the disk..... *picea* Fisher.
7. Head black; surface above purplish *parvula* Waterhouse.
 Head aeneous or bluish-green 8
8. Surface above brunneo-aeneous *convexa* Waterhouse.
 Surface above rufo-cupreo *jubilans* Waterhouse.
9. Pronotum unicolored 10
 Pronotum bicolored 20
10. Elytra bicolored 11
 Elytra unicolored 13
11. Pronotum piceous, each elytron dark purple, with a golden-coppery spot at middle, and with apex bright blue..... *ornata* Fisher.
 Pronotum green or bronzy..... 12
12. Elytra dark bronzy, with a transverse light bronzy fascia *lata* Kerremans.
 Elytra cyaneous, with a strong violaceous tinge; each elytron with two golden-green spots along lateral margin *schwarzi* Fisher.
13. Head black..... 14
 Head green, bronzy, or coppery..... 15
14. Sides of pronotum broadly flattened; elytra dark green.. *crassa*, var. Waterhouse
 Sides of pronotum feebly flattened; elytra dark purple.
contigua, var. Waterhouse.
15. Head coppery..... 16
 Head green or bronzy..... 18
16. Elytra bluish-green *polita* Waterhouse.
 Elytra reddish-purple or coppery-red 17
17. Sides of pronotum broadly flattened; head coarsely punctured and intervals densely granulate-striolate; elytra reddish-purple with a strong greenish tinge on disk..... *mutabilis* Fisher.
 Sides of pronotum feebly flattened; head obsoletely punctured and striolate elytra coppery-red..... *inconspicua* Waterhouse.
18. Pronotum with the base deeply and transversely depressed.. *crassa* Waterhouse.
 Pronotum not transversely depressed along base at middle; surface coarsely punctate 19
19. Intervals on disk of pronotum smooth; color bright green..... *bicolor* Fisher.
 Intervals on disk of pronotum densely reticulate-striolate; color dull dark green.
subopaca Fisher.
20. Elytra bicolored..... 21
 Elytra unicolored 29
21. Elytra cupreous 22
 Elytra purplish or violaceous..... 24
22. Pronotum with the disk broadly infuscated, and sides narrowly margined with green; sutural regions of elytra infuscated..... *intermedia* Waterhouse.
 Pronotum with the disk not broadly infuscated; elytra bright coppery-red.. 23
23. Pronotum golden-green, with a narrow purple band on disk becoming slightly wider than scutellum at base; margin of elytra violaceous. *beltii* Waterhouse.
 Pronotum dark green, with an obscure dark triangular area on anterior part of disk, but not extending to base; elytra with humeral angles violaceous, and the lateral margin aureous..... *buscki* Fisher.

24. Elytra purplish, with two bright green fasciae on each elytra.
divisa Waterhouse.
 Elytra dark violaceous, ornated with green or coppery fasciae..... 25
25. Pronotum with short lateral carinae..... 26
 Pronotum without lateral carinae..... 28
26. Apex of elytra green, and with a median coppery-red fascia interrupted at the suture; pronotum with anterior part of disk brownish-black.
basalis Waterhouse.
 Apex of elytra not green..... 27
27. Pronotum with entire disk brownish-black; each elytron with a bright green band, commencing close to the scutellum and extending obliquely to the middle of elytron, where it meets a slightly oblique transverse band, and with a transverse spot near apex, which does not reach the suture.
puncticeps Waterhouse.
 Pronotum with a narrow brownish spot on disk; each elytron with a green spot at scutellum and a transverse lateral one at middle, connected to each other by a narrow line, and with a subapical fascia, which reaches to the suture.
venusta Waterhouse.
28. Transverse green fascia on elytra interrupted at the suture; head bluish-green.
interrupta Waterhouse.
 Transverse green fascia on elytra not interrupted at the suture; head golden-green..... *pulchra* Waterhouse.
29. Pronotum with the disk black, brownish-black, bronzy, or blue..... 30
 Pronotum with a median green band; sides dark blue, with a purplish tinge.
longula Waterhouse.
30. Pronotum with disk black, brownish-black, or bronzy..... 31
 Pronotum blue, with the sides green and the front margin cupreous.
viridifrons Waterhouse.
31. Disk of pronotum bronzy..... 32
 Disk of pronotum black or brownish-black..... 35
32. Base of pronotum transversely depressed..... 33
 Base of pronotum not transversely depressed..... 34
33. Pronotum with the anterior angles tinted with green.... *aeneifrons* Waterhouse.
 Pronotum with the sides bluish or greenish..... *attenuata* Fisher.
34. Pronotum with the sides broadly flattened, and the anterior margin greenish.
inaequalis Kerremans.
 Pronotum with the sides feebly flattened, and the anterior angles brassy.
difficilis Waterhouse.
35. Elytra bright copper-red, with the humeral angles violaceous, and the lateral margins aureous; pronotum dark green, with an obscure dark triangular area on disk..... *buscki* Fisher.
 Elytra purplish, black, or dark blue..... 36
36. Elytra black..... 37
 Elytra purplish or dark blue..... 39
37. Head entirely black..... *nitidicollis* Kerremans.
 Head green or bronzy..... 38
38. Pronotum with the sides coppery-red..... *levis* Kerremans.
 Pronotum with the sides green..... *lateralis* Waterhouse.
39. Elytra dark blue..... *placida* Waterhouse.
 Elytra of a dark purplish color..... 40
40. Disk of pronotum with stelliform punctures..... *contigua* Waterhouse.
 Disk of pronotum with round, shallow, and sparsely placed punctures.
purpureipennis Fisher.

LEIOPLEURA TRIVIALIS Waterhouse.

Leiopleura trivialis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 159, pl. 9, fig. 5.

This species was described from material collected by Mr. Champion on Taboga Island, Panama. The type is in the British Museum and has not been examined. The species is placed in the key from the characters given in the original description.

LEIOPLEURA MINUTA Kerremans.

Leiopleura minuta KERREMANS, Ann. Soc. Ent. France, vol. 63, 1894, p. 422.

Described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. It is represented in the National Museum Collection by one specimen collected at Tampico, Mexico, December 7, 1909, by E. A. Schwarz.

LEIOPLEURA NIGRA Waterhouse.

Leiopleura nigra WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 159.

Described from material collected by Mr. Champion at Bugaba, Panama, and the type, which is in the British Museum, has not been examined. The species has been placed in the key from characters furnished by a single example collected at Cordoba, Mexico, June 13, by Frederick Knab, which agrees very well with the original description.

LEIOPLEURA PICEA, new species.

Oblong, strongly convex, broadly rounded in front, broadly attenuate posteriorly, and slightly narrower behind than in front, moderately shining, and uniformly piceous above and beneath.

Head feebly convex and narrowly, obsoletely depressed on the front, the depression becoming obscure near the epistoma and on the vertex, with a narrow, longitudinal groove extending from the epistoma to a large, distinct, oblong fovea on the front; surface sparsely and irregularly punctate, the punctures very shallow and becoming obsolete on the front; intervals finely and obsoletely reticulate-striolate; antennae rather short and entirely piceous. Pronotum moderately convex, nearly three times as wide as long, distinctly narrower in front than behind, widest at the base; sides strongly, arcuately attenuate from base to anterior angles; posterior angles nearly rectangular; anterior margin broadly arcuately emarginate; base transversely truncate to near middle of the elytron, then feebly sinuate and turning obliquely backward to the scutellum; in front of which it is truncate; surface rather broadly flattened along the sides, with a broader, shallow depression near the posterior angles, and with two deep, narrow, lunate depressions on the disk, placed one on each side of the middle and about equally distant from base and anterior margin,

sparsely and irregularly punctate, the punctures very shallow and obsolete; intervals finely and densely reticulate-striolate, the reticulation becoming more distinct along the sides. Scutellum nearly smooth, and broadly triangular. Elytra rather strongly convex, as wide as pronotum at base, widest at middle; humeral angles obtusely angulated; sides feebly expanding to middle, then strongly, arcuately attenuate to the tips, which are conjointly, broadly rounded, the lateral margins entire; each elytron with a broad, shallow depression at the base, and a narrow one between the humerus and lateral margin, extending along the margin from the humeral angle to middle and becoming much broader behind the humerus; surface somewhat uneven at base, coarsely and irregularly punctate, the punctures obsolete and somewhat confused at base, but becoming finer and smooth toward apex; intervals finely and obsoletely reticulate-striolate. Abdomen beneath finely and densely reticulate-striolate; last segment narrowly rounded at apex. Metasternum with a few large, widely separated punctures, and the intervals finely and obsoletely reticulate-striolate. Prosternum finely and densely reticulate-striolate, with a few fine, obsolete punctures on the prosternal process; anterior margin truncate.

Length, 2.25 mm.; width, 1.3 mm.

Type locality.—Trinidad River, Panama.

Type.—Cat. No. 25123, U.S.N.M.

Described from a single specimen collected by August Busck May 4, 1911.

This species is closely allied to *unicolor* Kerremans, but it is shorter, more robust and convex, and more broadly attenuate posteriorly.

LEIOPLEURA PARVULA Waterhouse.

Leiopleura parvula WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 161, pl. 9, fig. 7.

This species was described from David, Panama, and the type is in the British Museum. It has not been examined by the writer, and the species is placed in the key solely upon the characters given in the original description.

LEIOPLEURA CONVEXA Waterhouse.

Leiopleura convexa WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 160-161, pl. 9, fig. 6.

Described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an altitude of 2,500 feet. This is a very convex species and has not been seen by the writer, but is placed in the key on the basis of the original description.

LEIOPLEURA JUBILANS Waterhouse.

Leiopleura jubilans WATERHOUSE. Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 163.

This species was described from Belize, British Honduras, and bears a great resemblance to *Lius dissimilis*. The type has not been examined, and the species has been placed in the key from the characters given in the original description.

LEIOPLEURA ORNATA, new species.

Oblong, moderately convex, broadly rounded in front, broadly attenuate posteriorly, and slightly narrower behind than in front, moderately shining; head, pronotum, and scutellum piceous, the head greenish on the front; elytra dark purple, with the apex bright blue, and each elytron ornated with a large, golden-coppery spot at the middle, and the side behind the humeral angle narrowly margined with dark blue; beneath piceous.

Head feebly convex, broadly and rather deeply depressed on the front, with a narrow, rather obsolete, longitudinal groove extending from the epistoma to the vertex; surface coarsely and rather sparsely punctate; intervals finely and densely reticulate-striolate; antennae rather short, piceous, with a slight aeneous tinge. Pronotum evenly convex, two and one-half times as wide as long, considerably narrower in front than behind, widest at the base; sides strongly arcuately attenuate from base to anterior angles; posterior angles feebly projecting and rather acute; anterior margin broadly, arcuately emarginate; base transversely truncate to near middle of elytron, then feebly sinuate and turning obliquely backward to the scutellum, in front of which it is obsoletely, arcuately emarginate; surface narrowly flattened along sides, with the margin slightly elevated, and with an obsolete, lateral carina extending from the base to near the middle and nearly parallel to the lateral margin, there is also a broad, shallow depression near the posterior angles, coarsely and sparsely punctate; intervals nearly smooth on the disk, but becoming finely and densely reticulate-striolate toward the sides and in the basal depressions. Scutellum smooth and broadly triangular. Elytra rather strongly convex, as wide as pronotum at base; humeral angles obtusely angulated; sides parallel to middle, then strongly, arcuately attenuate to the tips, which are rather narrowly, conjointly rounded, the lateral margins feebly serrate; humeri well developed; each elytron with a broad, rather deep depression at the base, and a narrower one between the humerus and lateral margin, extending along the margin from the humeral angle to middle, and becoming broader behind the humerus; surface rather coarsely wrinkled at humeral regions, and coarsely, irregularly, and rather densely punctate, the punctures very shallow, but becoming more obsolete toward the apex; intervals finely

and obsolete reticulate-striolate. Abdomen beneath finely and densely reticulate-striolate, with a few short, obscure hairs; last segment broadly rounded at apex. Prosternum obsolete reticulate-striolate; anterior margin feebly sinuate. Metasternum with a few coarse punctures.

Length, 2.5 mm.; width, 1.4 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type.—Cat. No. 25124, U.S.N.M.

Described from a single specimen collected by E. A. Schwarz March 18, 1911.

This species is slightly more robust than *picea* Fisher, and each elytron is ornated with a large, golden-coppery spot.

LEIOPLEURA LATA Kerremans.

Leiopleura lata KERREMANS, Ann. Soc. Ent. France, vol. 63, 1894, p. 422.

Described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. The origin of the specimens collected under these conditions should be verified, as tobacco from Brazil and other localities was stored in the same building. The species is unknown to the writer and is placed in the key from the characters given in the original description.

LEIOPLEURA CRASSA Waterhouse.

Leiopleura crassa WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 155-156, pl. 9, fig. 3.

This species was described from material collected at Bugaba, Taboga Island, Volcan de Chiriqui, Panama; and Cacoj in Vera Paz, Las Mercedes, and Cerro Zunil, Guatemala. The type locality for the typical form is Bugaba, Panama. The species is very variable in color, and varies from entirely black examples to those with the head and pronotum bluish-green and the elytra dark blue, which is considered the typical form. There are two entirely black specimens in the National Museum Collection; one collected at Porto Bello, Panama, March 9, 1911, by E. A. Schwarz, and the other one at Paraiso, Canal Zone, Panama, April 6, 1911, collected by the same collector, which agree with the description given for the black variety by Waterhouse.

LEIOPLEURA SCHWARZI, new species.

Broadly ovate, feebly convex, slightly longer than wide, broadly rounded in front, slightly narrower behind than in front, and strongly shining; head and pronotum light bluish-green; scutellum brownish; elytra cynaneous, with a strong violaceous tinge, each elytron with two large, golden-green spots along the lateral margin; beneath piceous.

Head feebly convex, broadly and deeply depressed on the front, with a distinct narrow longitudinal groove extending from the epistoma to the vertex, the groove deeply impressed on the front, but becoming obsolete on the vertex; surface coarsely and rather densely punctate; intervals finely and densely granulated; antennae moderately long, piceous, with the first few joints slightly greenish. Pronotum evenly convex, three times as wide as long, considerably narrower in front than behind, widest at the base; sides strongly, arcuately attenuate from the base to anterior angles; posterior angles nearly rectangular; anterior margin deeply, arcuately emarginate; base transversely truncate to near the middle of the elytron, then feebly sinuate and turning obliquely backward to the scutellum, in front of which it is truncate; surface with a broad, shallow depression on each side along the base in front of the elytral depressions, coarsely and rather densely punctate; intervals nearly smooth on the disk, becoming coarsely and densely granulate-striolate toward the sides, and nearly obscuring the punctation. Scutellum smooth and broadly triangular. Elytra moderately convex, as wide as pronotum at base, widest at basal third; humeral angles obtusely rounded; sides broadly, arcuate to middle, then strongly, arcuately attenuate to the tips, which are conjointly, narrowly rounded, the lateral margin obsoletely serrate; humeri well developed; each elytron with a broad, deep depression at base, and a deep, narrow one between the humerus and lateral margin, extending along the margin from the humeral angle to the middle, and becoming broader behind the humerus, ornated with two golden-green fasciae, the first a broad, transverse one at middle, extending from the lateral margin to the sutural fourth, and the second, a somewhat triangular one near the apex, extending from the lateral margin to near the suture, both of these fasciae are slightly oblique, the posterior one more strongly so than the anterior one; surface finely, irregularly, and rather densely punctate, the punctures becoming coarser on the green fasciae; intervals finely and obsoletely reticulate-striolate. Abdomen beneath finely and obscurely punctate, with the intervals finely and densely reticulate-striolate; last segment broadly rounded at apex. Metasternum and prosternum more coarsely punctured than abdomen, the latter with the anterior margin feebly, arcuately emarginate.

Length, 2.85 mm.; width, 2 mm.

Type locality.—Porto Bello, Panama.

Type and paratype.—Cat. No. 25125, U.S.N.M.

Described from two specimens collected by August Busck March 3 and 4, 1911.

This species is allied to *pulchra* Waterhouse, but the head and pronotum are not golden-green, and the green fasciae on the elytra do not extend to the suture. It is also closely allied to *claveri* de-

scribed by Kerremans from Colombia, but differs from that species by having the pronotum entirely green, the scutellum brown, and the anterior green fascia on the elytra not extending around the humeri.

LEIOPLEURA CONTIGUA Waterhouse.

Leioleura contigua WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889 p. 154, pl. 9, fig. 2.

Described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an altitude of 3,500 feet. This species is somewhat variable in color, and Waterhouse describes the typical form as having the elytra dark purple, head and pronotum green, with the median part of the pronotum brownish-black. A second specimen collected at the same locality differs from the type by having the head and entire pronotum black. The species is not represented in the National Collection and is placed in the key solely upon the characters given in the original description.

LEIOPLEURA POLITA Waterhouse.

Leioleura polita WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 162, pl. 9, fig. 8.

The type locality of this species is Bugaba, Panama, and the type, which is in the British Museum, has not been examined. The species is convex, elongate, and strongly attenuate posteriorly, and in form resembles *parvula*, but differs from it in color. It is placed in the key upon the characters given in the original description.

LEIOPLEURA MUTABILIS, new species.

Oblong, feebly convex, broadly rounded in front, broadly attenuate posteriorly, and slightly narrower behind than in front, moderately shining; head and pronotum dark cupreous, with a slight greenish reflection; scutellum brownish, with an obsolete cupreous tinge; elytra obscurely reddish-purple, with a strong greenish tinge on the disk, and the sides near the humeral angles narrowly margined with violet; beneath piceous.

Head feebly convex and broadly depressed on the front, the depression rather deep at the middle, but becoming obsolete near the epistoma and on the vertex, with a distinct, narrow, longitudinal groove extending from the epistoma to the front, where it is abruptly ended; surface coarsely and rather sparsely punctate; intervals densely and finely granulate-striolate; antennae rather short and entirely piceous. Pronotum moderately convex, two and one-half times as wide as long, narrower in front than behind, widest near the base; sides nearly parallel to basal fourth, then strongly, arcuately attenuate to the anterior angles; posterior angles feebly projecting and rather acute; anterior margin broadly, arcuately

emarginate; base feebly, transversely sinuate to near middle of elytron, then turning obliquely backward to the scutellum, in front of which it is obsoletely, arcuately emarginate; surface rather broadly flattened along the sides, the lateral margin slightly elevated, and with an obsolete lateral carina, which is more distinct at middle than base, there is also a broad deep depression in front of the posterior angle, sparsely punctate, the punctures very shallow and stelliform; intervals nearly smooth on the disk, becoming densely granulate-striolate at the sides and in the depressions. Scutellum nearly smooth and broadly triangular. Elytra feebly convex, as wide as pronotum at base, widest just behind the middle; humeral angles broadly rounded, sides feebly expanding to just behind the middle, then strongly, arcuately attenuate to the tips, which are conjointly narrowly rounded, the lateral margins distinctly serrate; humeri prominent; each elytron with a broad deep depression at the base, and narrow, deeper one between the humerus and the lateral margin, extending along the margin from the humeral angle to near the apex, the depression is slightly broader behind the humerus; surface slightly wrinkled at the sides, coarsely, irregularly, and rather densely punctate, the punctures becoming obsolete behind the middle; interval nearly smooth. Abdomen beneath finely and densely reticulate-striolate, with a few obsolete punctures, and very sparsely clothed with short, inconspicuous, cinereous hairs. Prosternum punctured similar to that of the abdomen; anterior margin feebly sinuate. Metasternum more coarsely punctured than abdomen.

Length, 2.4 mm.; width, 1.25 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type and paratype.—Cat. No. 25126, U.S.N.M.

Described from two specimens collected by E. A. Schwarz April 18, 1911.

LEIOPLEURA INCONSPICUA Waterhouse.

Leiopleura inconspicua WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 162.

This species was described from material collected by Mr. Blancaneaux at Belize, British Honduras. It is unknown to the writer and is placed in the key on the basis of the original description.

LEIOPLEURA BICOLOR, new species.

Oblong, moderately convex, broadly rounded in front, broadly attenuate posteriorly, and nearly as wide behind as in front, strongly shining; head and pronotum bright green; scutellum piceous; elytra cyaneous; beneath piceous.

Head feebly convex, and broadly depressed on the front, the depression rather deep on the front but becoming obsolete on the

vertex, with a narrow, obsolete, longitudinal groove extending from the epistoma to a small, obscure fovea on the front; surface coarsely, irregularly, and sparsely punctate; intervals smooth; antennae rather short and entirely piceous. Pronotum moderately convex, three times as wide as long, distinctly narrower in front than behind, widest near the base; sides nearly parallel to basal fourth, then strongly, arcuately attenuate to anterior angles; posterior angles rectangular; anterior margin broadly, arcuately emarginate; base transversely truncate to near middle of elytron, then feebly sinuate and turning obliquely backward to the scutellum, in front of which it is subtruncate; surface broadly and rather deeply depressed at the sides, the depression becoming gradually broader posteriorly and extending internally to the elytral lobe, sparsely and rather coarsely punctate, the punctures round and deep on the disk and stelliform in the depressions; intervals smooth on the disk, but becoming finely reticulate-striolate at the sides. Scutellum smooth and broadly triangular. Elytra moderately convex, as wide as pronotum at base, widest at about basal third; humeral angles rather obtusely angulated; sides feebly expanding to basal third, then strongly, arcuately attenuate to the tips, which are conjointly narrowly rounded, the lateral margins entire; humeri moderately developed; each elytron with a broad, deep depression at the base, and a narrow one between the humerus and lateral margin extending along the margin from the humeral angle to the middle and becoming much broader behind the humerus; surface feebly wrinkled at sides and humeral regions, coarsely, irregularly, and rather densely punctate; intervals entirely smooth. Abdomen beneath finely and obsoletely punctate, with a few inconspicuous hairs; intervals finely and densely reticulate-striolate, with a few long, widely separated rugae on the first segment; last segment broadly rounded at apex. Prosternum nearly smooth, with a few widely separated punctures; anterior margin feebly, arcuately emarginate. Metasternum sparsely and coarsely punctate; intervals smooth on anterior part, but becoming densely and finely reticulate-striolate on balance of surface.

Length, 2.75 mm.; width, 1.6 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Other localities.—Porto Bello, Panama.

Type and paratype.—Cat. No. 25127, U.S.N.M.

Described from two specimens. The type was collected by E. A. Schwarz April 29, 1911, and the paratype by the same collector March 10, 1911.

This species is allied to *crassa* Waterhouse, but it does not have the pronotum transversely impressed at the base, and the posterior angles are rectangular, and not acute and directed backward as in *crassa*.

LEIOPLEURA SUBOPACA, new species.

Oblong, moderately convex, broadly rounded in front, broadly attenuate posteriorly, and slightly narrower behind than in front, subopaque; head and pronotum dull, dark green; scutellum piceous; elytra dark cyaneous; beneath piceous.

Head feebly convex and broadly depressed on the front, the depression deep on the front, but becoming obsolete on the vertex, with a distinct narrow, longitudinal groove extending from the epistoma to a small, obscure fovea on the front; surface coarsely, irregularly, and sparsely punctate; intervals densely and finely reticulate-striolate; antennae rather short and piceous, with a slight aeneous tinge. Pronotum moderately convex, three times as wide as long, narrower in front than behind, widest at base; sides nearly parallel to basal third, then strongly, arcuately attenuate to anterior angles; posterior angles feebly projecting and rather acute; anterior margin broadly, arcuately emarginate; base feebly, transversely sinuate to near middle of elytron, then feebly, arcuately emarginate for the elytral lobe, and turning obliquely backward to the scutellum, in front of which it is truncate; surface broadly and rather deeply depressed at the sides, the depression broader and obsoletely triangular at base and extending internally to the elytral lobe, sparsely punctate, the punctures very shallow and stelliform; intervals finely and densely reticulate-striolate, the striolation denser and coarser at the sides. Scutellum finely reticulate and broadly triangular. Elytra moderately convex, as wide as pronotum at base; humeral angles broadly rounded; sides nearly parallel to middle, then strongly, arcuately attenuate to the tips, which are separately and rather acutely rounded, the lateral margins obsoletely serrate; humeri rather prominent; each elytron with a rather broad, deep depression at the base, and narrow one between the humerus and lateral margin, extending along the margin from the humeral angle to behind the humerus, where the depression is much broader; surface feebly wrinkled at the sides, coarsely, irregularly, and rather densely punctate, the punctures shallow, and becoming obsolete behind the middle; intervals finely and densely reticulate-striolate. Body beneath sparsely punctate, the punctures rather obsolete on the abdomen, but becoming coarser on rest of surface; intervals densely and rather coarsely reticulate-striolate, with a few long, widely separated rugae on the anterior part of the first abdominal segment. Abdomen very sparsely clothed with inconspicuous hairs, and the last segment broadly rounded at apex; prosternum with the anterior margin feebly, arcuately emarginate.

Length, 2.9 mm.; width, 1.6 mm.

Type locality.—Paraiso, Canal Zone, Panama.

Type.—Cat. No. 25128, U.S.N.M.

Described from a single specimen collected by E. A. Schwarz March 26, 1911.

This species is very closely allied to *bicolor* Fisher, but differs from that species in being subopaque, the head and pronotum of a different shade of green, and the surface densely reticulate-striolate and not smooth at the middle, as in *bicolor*.

LEIOPLEURA INTERMEDIA Waterhouse.

Leiopleura intermedia WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 154, pl. 9, fig. 1.

This species was described from material collected by Mr. Champion at Cerro Zunil, Guatemala, at an altitude of 4,500 feet. This is a rather broad, depressed species, with the sides of the elytra subparallel for two-thirds their length, and then broadly attenuate to the apex. The type is in the British Museum and has not been examined, but the species is given its position in the key from the characters given in the original description.

LEIOPLEURA BELTH Waterhouse.

Leiopleura belthii WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1897, p. 666.

This beautiful species was described from Chontales, Nicaragua. It has the head and pronotum golden green, and the elytra of a bright, shining, coppery color, and which is differently colored from all the other species of the genus, except *buscki*, from which it differs by the characters given in the key and description. It is not represented in the National Museum Collection, but it is placed in the key from the characters given in the original description.

LEIOPLEURA BUSCKI, new species.

Ovate, moderately convex, broadly rounded in front, broadly attenuate posteriorly, and slightly narrower behind than in front, strongly shining; head and pronotum dark green, the latter with an obscure, dark, triangular area on the disk; scutellum brown, with a cupreous tinge; elytra bright coppery-red, with the sides for a short distance behind the humeral angles narrowly margined with violet, then becoming aureous posteriorly; beneath piceous.

Head nearly flat and broadly, obsoletely depressed on the front, with a rather obsolete, narrow, longitudinal groove extending from the epistoma to a large oblong fovea on the front; surface finely, irregularly, and very sparsely punctate; intervals smooth; antennae rather long and strongly aeneous. Pronotum rather strongly convex three times as wide as long, distinctly narrower in front than behind, widest at base; sides strongly, arcuately attenuate from base to anterior angles; posterior angles feebly projecting and rather acute;

anterior margin broadly, arcuately emarginate; base transversely truncate to near middle of elytron, then feebly sinuate and turning obliquely backward to the scutellum, in front of which it is truncate; surface strongly flattened at the sides (very narrowly at the middle), but feebly expanding to the anterior angles; posteriorly the depression is very broad and deep, extending internally as far as the basal depressions on the elytra, these depressions causing a subarcuate elevation at the middle extending from the disk to near the lateral margin, sparsely punctate, the punctures rather coarse on the disk, but becoming obsolete toward the sides; intervals nearly smooth, but becoming finely and obsoletely reticulate-striolate in the depressions. Scutellum smooth and broadly triangular. Elytra rather strongly convex, as wide as pronotum at base, widest at middle; humeral angles obtusely angulated; sides feebly sinuate at basal third, slightly, arcuately rounded at middle, then strongly, arcuately attenuate to the tips, which are rather subtruncate, the lateral margins entire; each elytron with a broad, obsolete depression at the base, and a deep, narrow one between the humerus and lateral margin, extending along the margin from the humeral angle to the middle and becoming broader behind the humerus; humeri rather prominent; surface slightly wrinkled at the sides, and coarsely punctate, the punctures widely separated and arranged in rows, and becoming more obsolete toward the apex; intervals finely and sparsely punctured. Abdomen beneath finely and obsoletely punctate, the intervals finely and densely reticulate-striolate, except on the first segment, where the surface is rugose, the rugae coarse and widely separated; last segment broadly rounded at apex. Prosternum finely and very sparsely punctated; intervals smooth: anterior margin truncate. Metasternum with a few very coarse punctures at the middle, and with coarse, widely separated rugae at the sides.

Length, 3.25 mm.; width, 2 mm.

Type locality.—Trinidad River, Panama.

Type and paratype.—Cat. No. 25129, U.S.N.M.

Described from two specimens collected by August Busck March 25, 1912.

LEIOPLEURA DIVISA Waterhouse.

Leiopleura divisa WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 155.

Described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an altitude of 2,500 feet. It is not represented in the National Museum Collection, and has been placed in the key from the characters given in the original description.

LEIOPLEURA BASALIS Waterhouse.

Leioleura basalis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 153-159.

Described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an altitude of 2,500 feet. It is not represented in the National Museum Collection, and has been placed in the key from the characters given in the original description.

LEIOPLEURA PUNCTICEPS Waterhouse.

Leioleura puncticeps WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 156-157.

This species was described from material collected at Acapulco in Guerrero, Teapa in Tabasco, Mexico; Panama, San Juan, and Chacoj in Vera Paz, Guatemala; and Bugaba, Panama, without designating any definite type locality. From the description this species is quite variable in color and markings. It has not been seen by the writer, and is placed in the key solely upon the characters given in the original description.

LEIOPLEURA VENUSTA Waterhouse.

Leioleura venusta WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 157-158.

The type of this species was collected at Volcan de Chiriqui, Panama, at an altitude of 3,500 feet. Waterhouse also records two other specimens which vary in the arrangement of the markings on the elytra, one of which was collected at San Geronimo, Guatemala, and the other at Cerro Zunil, Guatemala, at an altitude of 4,000 to 5,000 feet. There is a specimen in the National Museum Collection, collected at Porto Bello, Panama, April 18, 1912, by August Busck, which differs from the typical form by having the posterior green fascia covering the entire apical fifth of the elytra, but otherwise corresponds to the description given for this species.

LEIOPLEURA INTERRUPTA Waterhouse.

Leioleura interrupta WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 158.

This species was described from material collected by Mr. Champion at Bugaba, Panama. The type is in the British Museum, and has not been examined. It has been placed in the key from the characters given in the original description.

LEIOPLEURA PULCHRA Waterhouse.

Leioleura pulchra WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 156, pl. 9, fig. 4,

This species was described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an altitude of 2,000 to 3,000 feet.

The type, which is in the British Museum, has not been examined; the species has been given its position in the key on the basis of the original description.

LEIOPLEURA LONGULA Waterhouse.

Leioleura longula WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 162-163.

Described from material collected by Sallé at Cordoba, Mexico. The species is more elongate than *polita*, and strongly attenuate posteriorly. It is not represented in the National Museum Collection, but is placed in the key from the characters given in the original description.

LEIOPLEURA VIRIDIFRONS Waterhouse.

Leioleura viridifrons WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 156.

The type locality of this species is Volcan de Chiriqui, Panama, and was collected by Mr. Champion at an altitude of 5,000 feet. The species is unknown to the writer, and it is placed in the key from the characters given in the original description.

LEIOPLEURA AENEIFRONS Waterhouse.

Leioleura aeneifrons WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 160.

This species was described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an altitude of 2,500 feet. It is one of the elongate and rather slender species; the pronotum has the sides nearly parallel at the basal half, and the elytra is gradually attenuate from the base to the apex. The species is not represented in the National Museum Collection, but has been given its position in the key solely upon the characters given in the original description.

LEIOPLEURA ATTENUATA, new species.

Oblong, moderately convex, broadly rounded in front, strongly attenuate posteriorly, and distinctly narrower behind than in front, moderately shining; head blue, with the anterior margin greenish; pronotum, scutellum, and elytra strongly aeneous, the pronotum narrowly margined on the sides and behind the basal depressions with green; beneath piceous.

Head moderately convex, and very feebly longitudinally depressed on the front, the depression becoming obsolete near the epistoma and on the vertex, and in the bottom of which is an obscure, longitudinal groove with a distinct oblong fovea at the middle; surface sparsely and irregularly punctate, the punctures coarser and denser on the occiput, but becoming more obsolete on the front; intervals densely and coarsely granulated, which nearly obscures the punctures.

tation; antennae rather short and piceous, with the basal joints slightly greenish. Pronotum moderately convex, two times as wide as long, narrower in front than behind, widest at base; sides nearly parallel to apical third, then arcuately attenuate to anterior angles; posterior angles distinctly projecting and rather acute; anterior margin feebly, arcuately emarginate; base transversely sinuate to middle of elytron, then turning obliquely backward to the scutellum, in front of which it is obsoletely sinuate; surface narrowly depressed along the sides, and with a broad, transverse, concave depression along the base, with an obsolete sinuate lateral carina extending from the base to middle, and nearly parallel to the lateral margin, finely and sparsely punctate, the punctures very shallow and stelliform; intervals finely, obsoletely punctate, and obscurely reticulate, becoming densely and coarsely granulate-striolate in the green areas at sides. Scutellum smooth and triangular. Elytra feebly convex, slightly narrower at base than pronotum; humeral angles obtusely angulated; sides feebly sinuate behind humeri, slightly expanded at middle where they are equal in width to the base, then strongly, arcuately attenuate to the tips, which are conjointly narrowly rounded, the lateral margins rather strongly serrate; humeri moderately developed, and extending nearly to the lateral margin; each elytron with a broad, rather deep depression at the base, and a broad, shallow one along the lateral margin behind the humerus; surface feebly wrinkled near the base, coarsely, irregularly, and rather densely punctate, the punctures somewhat confused at the humeral regions, but becoming more obsolete toward the apex; intervals smooth. Abdomen beneath densely and finely reticulate-striolate, with a few long, widely separated rugae on the first segment; last segment broadly rounded at apex. Prosternum sparsely punctate, the punctures obsolete anteriorly, but becoming very coarse on the prosternal process; anterior margin truncate. Metasternum sparsely, obsoletely punctate, with the intervals densely reticulate-striolate, and with long, widely separated rugae on the median part.

Length, 2.75 mm.; width, 1.25 mm.

Type locality.—La Ceiba, Honduras.

Type and paratypes.—Cat. No. 25130, U.S.N.M.

Described from four specimens collected by F. J. Dyer August 23, 1916.

This species is rather variable in color. Paratype "a" is more violaceous on the elytra than the type; paratype "b" has the head cupreous, with a strong violaceous tinge on the occiput, pronotum without the green margins, and the entire upper surface strongly violaceous; paratype "c" has the head green, pronotum without the green margins, and the entire upper surface more piceous than in the type.

LEIOPLEURA INAEQUALIS Kerremans.

Leiopleura inaequalis KERREMANS, Ann. Soc. Ent. France, vol. 63, 1894, p. 423.

Described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. The species is unknown to the writer, and it has been placed in the key from the characters given in the original description.

LEIOPLEURA DIFFICILIS Waterhouse.

Leiopleura difficilis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 161.

This species was described from material collected by Mr. Champion at Caldera in Chiriqui, Panama, at an altitude of 1,200 feet. Waterhouse also records a specimen from Belize, British Honduras, which varies slightly from the type in not having the transverse wrinkles on the elytra. The type is in the British Museum and has not been examined. It is placed in the key on the basis of the original description.

LEIOPLEURA NITIDICOLLIS Kerremans.

Leiopleura nitidicollis KERREMANS, Ann. Soc. Ent. France, vol. 63, 1894, pp. 423-424.

Described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. The species is unknown to the writer, and it has been placed in the key from the characters given in the original description.

LEIOPLEURA LEVIS Kerremans.

Leiopleura levis KERREMANS, Ann. Soc. Ent. France, vol. 63, 1894, pp. 422-423.

Described from material collected in the refuse of tobacco imported into Paris, France, from Mexico. The species is unknown to the writer, and it has been placed in the key solely upon the characters given in the original description.

LEIOPLEURA LATERALIS Waterhouse.

Leiopleura lateralis WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, pp. 159-160.

This species was described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an altitude of 3,500 feet. It is represented in the National Museum Collection by a specimen collected by E. A. Schwarz at Paraiso, Canal Zone, Panama, on January 16, 1911.

LEIOPLEURA PLACIDA Waterhouse.

Leiopleura placida WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, 1889, p. 163.

This species was described from material collected by Mr. Champion at Volcan de Chiriqui, Panama, at an altitude of 2,500 feet. It is

not represented in the National Museum Collection and is unknown to the writer. The species is placed in the key on the basis of the original description.

LEIOPLEURA PURPUREIPENNIS, new species.

Broadly ovate, feebly convex, slightly longer than wide, broadly rounded in front, and nearly as broadly rounded posteriorly, moderately shining; head and pronotum bright green, the latter with a broad piceous area on the disk; scutellum piceous; elytra dark purple, with the sides narrowly margined with violet; beneath piceous.

Head nearly flat and broadly depressed on the front, the depression very deep near the epistoma, but becoming obsolete on the vertex, with a distinct, narrow, longitudinal groove extending from the epistoma to the vertex; and with a large, oblong fovea on the front situated in the median groove; surface coarsely and rather densely punctate; intervals densely and very coarsely vermiculate-striolate, which nearly obscures the punctation; antennae rather short and entirely piceous. Pronotum evenly convex, three times as wide as long, considerably narrower in front than behind, widest near base; sides arcuate to near middle, then strongly, arcuately attenuate to the anterior angles; posterior angles nearly rectangular; anterior margin deeply, arcuately emarginate; base transversely truncate to near middle of elytron, then abruptly, arcuately emarginate and turning obliquely backward to the scutellum, in front of which it is truncate; surface with the lateral margins slightly elevated, and the dark, median area covering one-third of the surface, with the anterior angles rounded, sparsely and rather coarsely punctate; intervals nearly smooth on the dark area, but densely and coarsely vermiculate-striolate on the green areas, the striolation nearly obscuring the punctation. Scutellum finely reticulate and very broadly triangular. Elytra feebly convex, as wide as pronotum at base; widest near the middle; humeral angles broadly rounded; sides feebly expanding to middle where they are broadly rounded, then strongly, arcuately attenuate to the tips, which are conjointly, broadly rounded, the lateral margins slightly elevated and obsoletely serrate; humeri rather prominent; each elytron with a broad, shallow depression at the base, and a narrow, deep one between the humerus and lateral margin, extending along the margin from the humeral angle to near the apex, broadly expanded behind the humerus, and with a broad, obsolete depression near the apex; surface coarsely, irregularly, and rather densely punctate, the punctures shallow and somewhat stelliform; intervals nearly smooth. Abdomen beneath sparsely and finely punctate, with a few very short, cinereous hairs; intervals finely and densely reticulate-striolate, with a few long rugae on the first segment; last segment very broadly rounded at apex. Pro-

sternum finely and densely reticulate-striolate anteriorly, becoming much smoother, and with a few fine punctures on the prosternal process; anterior margin feebly, arcuately emarginate. Metasternum finely and densely reticulate-striolate, with a few coarse, widely separated rugae at the sides.

Length, 3.4 mm.; width, 2.3 mm.

Type locality.—Cordoba, Vera Cruz, Mexico.

Other locality.—Tuxtla, Mexico.

Type and paratype.—Cat. No. 25131. U.S.N.M.

Described from two specimens. The type was collected by Frederick Knab, April 1, 1909, and the paratype by O. W. Barrett.

This species is allied to *contigua* Waterhouse, but it is broader, antennae and femorae entirely black, and the green and black areas on the pronotum are more distinctly separated.

LEIOPLEURELLA, new genus.

Head wide in front, rather flat and longitudinally grooved; epistoma separated from the front by a deep, transverse groove, rather strongly constricted between the antennal cavities, which are narrowly separated, anterior margin truncate. Antennae short, inserted when at rest, in a long, deep groove in the prosternum; joints 1 and 2 globular, and about equal in length; third joint narrow and equal in length to the second; joints 4 to 10, shorter than the second, about equal in length, very compact, and becoming slightly wider anteriorly, the outer joints nearly square; last joint oblong and rounded at the apex. Eyes large, elliptical, and parallel on the front. Pronotum much wider than long, strongly convex, without a median groove or carina; base bisinuate. Scutellum large, triangular. Elytra strongly convex, subparallel, obsoletely depressed at base, strongly declivous posteriorly; lateral margins serrate posteriorly; surface not costate. Prosternum wide, flat, and broadly rounded at apex; anterior margin truncate. Metasternum broadly emarginate in front for the reception of the prosternal process. Body beneath rather flat. Posterior coxae narrow, rather strongly dilated internally and externally; anterior margin sinuate; posterior margin broadly concave. Legs free, but inserted in rather shallow depressions; femora rather robust, somewhat flattened, and strongly narrowed at the apex; tibiae slender and feebly arcuate; tarsi short, the joints about equal in length; claws with a broad tooth at base, which is nearly as long as the outer acute tooth.

Genotype.—*Leiopleurella splendida*, new species.

This genus is closely allied to *Callimicra* Deyrolle. It differs, however, from that genus in having the body beneath rather flat, epistoma truncate in front, pronotum evenly convex and not depressed at sides and along base, antennae compact, and the joints

not triangular, and the eyes parallel. It is also allied to *Leioptleura* Deyrolle, from which it differs, by being more robust, parallel, and declivous posteriorly, front of head wider between the eyes, the antennae more compact, and the joints not triangular.

LEIOPLEURELLA SPLENDIDA, new species.

Form elongate, subparallel, strongly convex, broadly rounded in front, feebly attenuate posteriorly, and slightly narrower behind than in front; surface glabrous and strongly shining; head (except the anterior part which is piceous), pronotum, and scutellum cupreous, with a strong fiery-red reflection; elytra cyaneous; beneath piceous, with a feeble aeneous tinge.

Head flat on the vertex and occiput, feebly convex behind the epistoma, with a rather broad, shallow depression on the front, the depression becoming narrow and obsolete on the vertex and occiput; surface rather sparsely and irregularly punctate, the punctures large, deep, and widely separated; intervals obsolete reticulate-striolate on the vertex and occiput, the striae becoming more distinct behind the epistoma; antennae piceous, with a slight aeneous tinge, very short, reaching a little beyond the anterior angles of the pronotum. Pronotum strongly, evenly convex, without any depressions, more than two times as wide as long at middle, distinctly narrower in front than behind, widest at the apical third; sides strongly arcuate from base to apical third, then more strongly, arcuately attenuate to the anterior angles, which are obtusely rounded; anterior margin deeply, arcuately emarginated for the insertion of the head; base nearly transversely truncate to middle of elytron, then feebly emarginate, and with a broadly rounded lobe in front of the scutellum; posterior angles obtusely rounded; surface deeply and irregularly punctate, the punctures widely separated on the disk, but becoming denser, much larger, and somewhat confluent at the sides; intervals finely and densely reticulate-striolate, the striae nearly obsolete on the disk, becoming more distinct toward the sides. Scutellum one and one-half times as wide as long; surface densely, obsolete reticulate-striolate. Elytra strongly convex, slightly narrower than pronotum at base; humeral angles broadly rounded; sides nearly parallel to the apical third (feebly sinuate behind the humeri), then broadly, arcuately attenuate to the tips, which are conjointly broadly rounded; lateral margins strongly serrate posteriorly; each elytron with a broad obsolete depression at the base, and a similar one behind the humerus; surface sparsely and irregularly punctate, the punctures rather deep and coarse at the base, but becoming finer toward the apex; intervals widely, obsolete reticulate-striolate on the disk, becoming strongly rugose and finely granulated at the sides. Abdomen beneath sparsely, finely, and obsolete punctate; intervals

finely and densely reticulate-striolate; last segment broadly rounded posteriorly, with two sharp, widely separated spines at the apex. Prosternum finely transversely striolate anteriorly; prosternal process nearly smooth, with a few widely separated punctures.

Length, 4.75 mm.; width, 2.75 mm.

Type locality.—Trinidad River, Panama.

Type.—Cat. No. 25132, U.S.N.M.

Described from a unique specimen collected at Trinidad River Panama, June 2, 1912, by August Busck.

Tribe **MASTOGENINI** LeConte and Horn.

Mastogenini LECONTE and HORN, Classification of the Coleoptera of North America, Smiths. Misc. Coll., vol. 26, No. 507, 1883, pp. 199–200.

This is a very small tribe and contains only five described genera, two of which have been found within the area covered by the present paper. All of the known genera are included in the key, since *Micrasta* described by Kerremans from Brazil, and *Trigonogya* described by Schaeffer for a single species from Brownsville, Texas, may be found in Mexico and Central America in the near future. The genus *Ankareus* was erected by Kerremans for a number of species found in Madagascar.

The species of this group have the body somewhat cylindrical, nearly parallel, and scarcely narrowed behind. The front of the head is rather strongly narrowed by the insertion of the antennae; antennal cavities large and situated a certain distance from the eyes; base of pronotum truncate; sternal cavities for the insertion of the prosternal process, formed entirely within the metasternum, the mesasternum being scarcely visible; hind coxae scarcely dilated internally; tarsal claws broadly toothed.

So far, very little is known about the habits of any of the species of this group. Burke⁹ records *Mastogenius* as a twig-borer in fire-killed saplings of Spanish oak (*Quercus digitata*) in the Southern States, but none of the larvae were collected.

KEY TO THE GENERA.

1. Prosternum with distinct antennal cavities, and a carina on each side of middle. Trigonogya Schaeffer.
- Prosternum without antennal cavities or carina at middle..... 2
2. Eyes a little oblique, slightly converging on the occiput..... 3
- Eyes parallel..... 4
3. Antennae serrate from the fourth joint Mastogenius Solier.
- Antennae serrate from the third joint Ankareus Kerremans.
4. Antennae with the serrate joints triangular Micrasta Kerremans.
- Antennae with the joints elongate, and scarcely serrate on the inner side. Exaesthetus Waterhouse.

⁹U. S. Dept. Agri., Bull. No. 437, 1917, p. 7.

Genus **MASTOGENIUS** Solier.

Mastogenius SOLIER, Gay's Hist. Chile, Zool., vol. 4, 1849, pp. 507-508.

This genus contains 13 species, 1 of which is described as new in the present paper. Of the previously described species, 5 are found in the United States, 5 in South America, 1 in the West Indies, and 1 in Africa; the latter may not be congeneric with the species found in America.

MASTOGENIUS CYANEUS, new species.

Elongate, subparallel, uniformly dark blue above, except the scutellum, which is piceous; beneath piceous.

Head convex, without any median depression; surface rather densely, deeply, and coarsely punctate, with the intervals finely, reticulate; eyes distinctly closer on the occiput; antennae reaching to middle of pronotum, serrate from the fourth joint, second joint short, globose, third joint about as long but much narrower than the second, slightly shorter than the fifth, and scarcely half as long as the fourth. Pronotum regularly convex, about one and one-half times as wide as long, distinctly narrower in front than behind, widest at the middle, sides feebly arcuate from base to apical fourth, then strongly, arcuately converging to the anterior angles; posterior angles feebly obtuse; anterior margin feebly, arcuately emarginate when viewed from above; base truncate; surface densely and coarsely punctate similar to that of the head, the punctures deep and regularly placed, and from each arises a very fine, rather long, recumbent hair; intervals finely reticulate. Scutellum ogival form, smooth. Elytra strongly convex, as wide as pronotum at base; sides nearly parallel to apical third, then arcuately attenuate to near the apex, where they are feebly sinuate, the tips strongly gibbose, and separately, broadly rounded; humeral angles obtusely rounded; surface with a deep transverse depression at the base, and a broadly obsolete one behind the humeri, rather coarsely punctate, and with the punctures a little more widely separated, and the pubescence finer and more obsolete than on the pronotum; intervals nearly smooth. Abdomen beneath strongly convex, sparsely, finely punctate and sparsely clothed with short, recumbent, cinereous hairs; intervals finely reticulate; last segment broadly rounded at apex. Prosternum and metasternum coarsely and rather densely punctate, the punctures very deep and well separated on the prosternal process; prosternum without antennal cavities. Posterior margin of hind coxal plate feebly sinuate.

Length, 2.75 mm.; width, 1.75 mm.

Type locality.—Ancon, Canal Zone, Panama.

Type.—Cat. No. 25133, U.S.N.M.

Described from a single specimen collected by E. A. Schwarz, May 5, 1911.

This is the first species of this genus to be described from Central America, although the species of this genus extends from the United States into South America. When these small and apparently rare insects are better known, there probably will be a number of species found in Central America and Mexico.

Genus EXAESTHETUS Waterhouse.

Exaesthetus WATERHOUSE, Biol. Centr.-Amer. Coleopt., vol. 3, pt. 1, Suppl., 1889, pp. 192-193, pl. 9, figs. 15, 15a-e.

Only one species is described in this genus and, as it is unknown to the writer, a copy of the original description is given in full.

Antennal sockets small, not very approximate. The antennae a little longer than the head and thorax together, hairy; the first and second joints moderately large, the following ones slender, elongate (Tab. ix, fig. 15a). Thorax convex, transversely impressed at the base, finely margined at the sides, the anterior angles deflexed and not visible from above. Scutellum elongate, arcuately acuminate (fig. 15b). Elytra as broad as the base of the thorax, subparallel, arcuately narrowed at the apex, without costae. Prosternum without chin piece; the intercoxal process subquadrate, obtusely rounded at the apex, almost truncate, and met posteriorly by a slight projection of the metasternum. Metathoracic episterna moderately wide, subparallel. Posterior coxae of nearly equal width throughout (fig. 15c). Abdomen with the first and second segments united into one; the intercoxal process acuminate. Legs rather slender; the tibiae straight; the tarsi moderately long, the second and third joints with a very small lamina, which is scarcely distinguishable when dry, the fourth joints with a rather large, delicate lamina; the claws dilated at their basal half (figs. 15d, e).

I think this very aberrant Buprestid may be placed next to *Mastogenius*. Its general appearance is suggestive of *Haplocnemus* in the Dasytidae.

EXAESTHETUS DASYTOIDES.

Elongatus, paullo convexus, nitidus, subtus fere niger, supra nigrescentiaeneus; capite leviter convexo, sat crebre subtiliter punctato; thorace antice angustato, convexo, sat crebre evidenter punctato, lateribus sat rotundatis; elytris sat crebre fortiter punctatis. Long. 2 lin.

Hab. Mexico, Jalapa (Höge).

The head has an impression in the middle of the lower part of the face. The thorax is impressed at the base, convex on the disk; the punctures are very distinct, rather close together. The elytra have the punctures rather strong and moderately close together.

MINERALOGIC NOTES ON PUCHERITE, PYRITE, TRICHALCITE, AND WAVELLITE.

By EARL V. SHANNON,

Assistant Curator of Geology, United States National Museum.

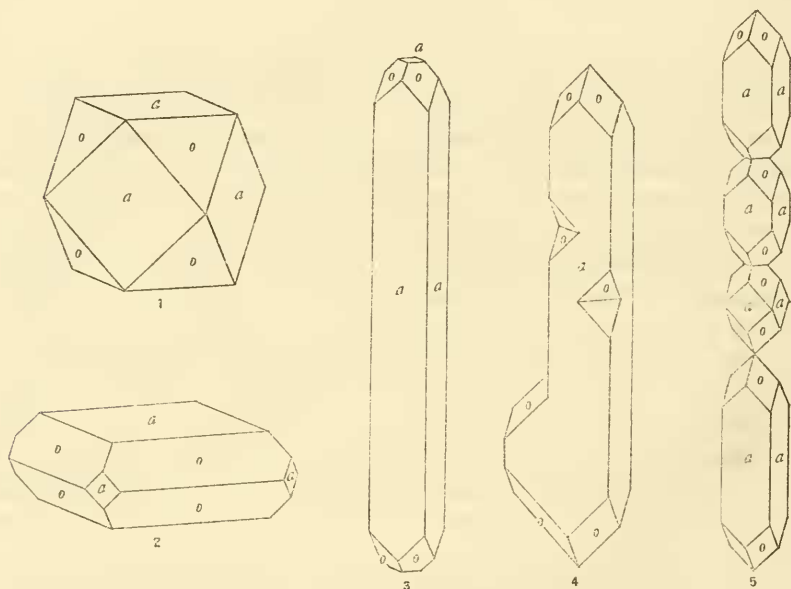
INTRODUCTION.

Minor investigations are constantly being conducted in this laboratory for the necessary purpose of accurately ascertaining the mineralogic identity of materials. These may be specimens submitted for identification by correspondents, they may be new and unlabeled material to be placed upon exhibition or filed with the reference collections, or they may be specimens already incorporated in the collections whose labeling is found to require confirmation or correction. These investigations may be conducted by chemical, optical, or crystallographic methods or a combination of these as the case may require. Almost invariably new facts of importance are developed by these studies, and it is desirable that the results be published, firstly in order to permanently record the evidence upon which the specimen is labeled and secondly because the new data furnished in regard to the properties or occurrence of rare and unusual minerals are of interest and value to mineralogical science in general.

It is a practice previously inaugurated in this department to combine several of these minor researches, even when they are not directly related to each other, into a paper of convenient length for publication in the Museum Proceedings. In the present contribution there are assembled short papers on four different subjects: Pyrite crystals of unusual crystallographic development from Arkansas, Pucherite from a new locality in Brazil in measurable crystals agreeing with those previously recorded on European material and showing one new form, Trichalcite from a new locality in Idaho having optical properties agreeing with those of the mineral from the original locality and showing measurable crystals which add new information regarding the crystallography of this rare arsenate, and Crystallographic and optical properties of wavellite crystals of two specimens from Montgomery County, Ark.

UNUSUAL PYRITE CRYSTALS FROM ARKANSAS.

A specimen recently received for examination from Mr. C. A. McClelland of Stillwater, Ark., contains pyrite crystals of such unusual development as to merit a brief description. The crystals are small, averaging less than a millimeter in diameter, and are attached to the faces of imperfect quartz crystals which line vuggy cavities in white quartz. The quartz forms veins up to 2 inches thick in a black highly graphitic slate. No other minerals are associated with the pyrite. The crystals all show the simple combination of cube $a(100)$ and octahedron $o(111)$ both prominently developed. Their



FIGS. 1-5.—PYRITE CRYSTALS FROM STILLWATER, ARK.

claim to distinction lies in their unsymmetrical development. Many of the crystals are cuboctahedrons of normal proportions. (Fig. 1.) From this habit they vary to long prismatic with the length 10 to 20 times the diameter as illustrated in Figure 3, the apparently tetragonal prism being formed by the vertical faces of the cube, while the octahedral planes form a terminal pyramid, often truncated at its summit by a minute cube face. The faces are practically perfect and free from striations, although some of the long prisms taper slightly, as indicated by the following angular measurements, which were made on a crystal of the habit illustrated in Figure 3.

Measurements on elongated pyrite crystal from Arkansas.

No.	Form.	Reflections.	Measured.		Calculated.	
			φ	ρ	φ	ρ
			o /	o /	o /	o /
1	<i>a</i> (100)	Very good.....	0 00	89 16	0 00	90 00
2	<i>a</i> (100)	Poor, blurred, two signals.....	0 28	89.17	0 00	90 00
3	<i>a</i> (100)	Very good.....	0 00	89 25	0 00	90 00
4	<i>a</i> (100)	Good.....	0 19	89 25	0 00	90 00
5	<i>a</i> (001)	Minute, reflection only.....		0 00		0 00
6	<i>o</i> (111)	Excellent.....	45 00	54 47	45 00	54 44
7	<i>o</i> (111)	Good.....	44 52	54 39	45 00	54 44
8	<i>o</i> (111)	Fair.....	45 10	54 39	45 00	54 44
9	<i>o</i> (111)	Good.....	44 45	54 39	45 00	54 44

In the other direction the crystals are flattened into moderately thin square tables of the habit illustrated in Figure 2. A crystal showing one of the numerous variations of the elongated cuboctahedrons is illustrated in Figure 4. Not uncommonly crystals of moderate elongation are aligned into strings of individuals in parallel position as shown in Figure 5. Occasionally scepter crystals are thus formed by an equidimensional individual being perched atop a long prism.

Variouly elongated crystals of pyrite have been described from a number of localities, but crystals of such extreme deviation from normal symmetrical development are by no means common. Whitlock¹ has figured greatly elongated cubes occurring in or with calcite and dolomite, from Rondout, Ulster County, N. Y. One of the illustrated crystals showed small octahedral planes and was thus very similar to those from Arkansas here described. Some of the New York crystals were twinned on the spinel law, giving unusual T and L shaped forms, and the terminal individuals of scepter crystals were oriented in twinned position. No definite twins could be found in the Arkansas specimen, certain pairs simulating twins being found to be only in accidental contact.

The distorted octahedra from French Creek, Pa., described by Penfield,² are very different from these elongated individuals.

PUCHERITE FROM MINAS GERAES, BRAZIL.

A specimen (Cat. 94221) which has recently been received by the Museum from Mr. J. E. Carney, jr., through Mr. F. L. Hess, was identified by Mr. Hess as pucherite, the rare bismuth vanadate. Crystallographic measurements confirm Mr. Hess's identification.

¹ Herbert P. Whitlock. Bull. New York State Museum No. 98, p. 6, 1905.

² S. L. Penfield. On some curiously developed pyrite crystals from French Creek, Delaware County, Pa. Amer. Journ. Sci., vol. 37, p. 209, 1899.

Pucherite has not heretofore been reported from Brazil and, since the crystal measured shows one form new to the mineral, the results are presented briefly. Crystallized pucherite has previously been known only from Europe, although earthy and pulverulent material has been found in Arizona and California.

The present specimen is from a weathered pegmatite vein in Sao Jose de Bryauba in the Province of Minas Geraes, Brazil. The specimen consists of a mass of pale yellow earthy bismutite which has a

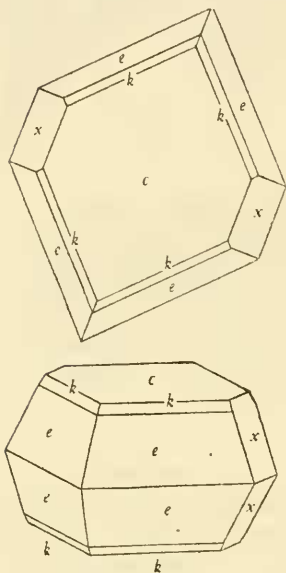


FIG. 6.—ORTHOGRAPHIC AND CLINOGRAPHIC DRAWINGS OF A PUCHERITE CRYSTAL FROM MINAS GERAES, BRAZIL.

faintly woody structure, as though pseudomorphous after some columnar mineral. The exterior of the specimen is partly coated with the crystalline pucherite, while some pucherite is also disseminated through the interior of the bismutite mass. The pucherite is dull dark brownish red in color and forms crusts of imperfect, intergrown, and somewhat bruised crystals. Only one crystal was measured, and very few of those on the specimen are suitable for measurement. The crystal measured had the form shown in orthographic and clinographic projections in Figure 6. The dominant planes are, as shown, the base $c(001)$ and the pyramid $e(121)$, with $x(021)$ and $k(122)$ as smaller faces. The basal pinacoid $c(001)$ gives an excellent signal, which serves to orient the crystal in polar position. The dome $x(021)$ also gives very good signals, while the pyramid $e(121)$ is wavy and striated parallel with its intersection with the base. The pyramid $k(122)$ has not previously been recorded for this species. It occurs as relatively narrow faces giving only moderately good signals. The measurements on the crystal are tabulated below:

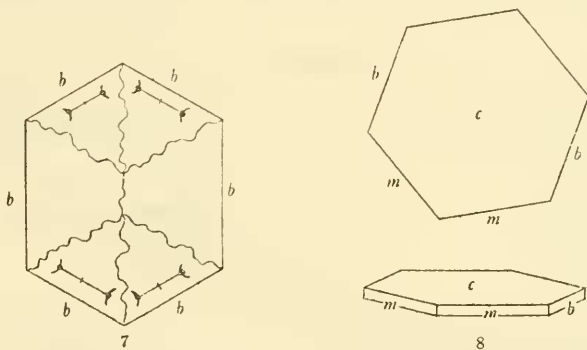
Forms and angles on pucherite from Brazil.

Letter.	Miller.	Symbol.	Measured.		Calculated.	
			φ	ρ	φ	ρ
c	(001)	0	o /	o /	o /	o /
x	(021)	02	0 00	66 49	0 00	66 49
e	(121)	12	43 14	72 40	43 11	72 40
k	(122)	$\frac{1}{2}1$	43 34	58 49	43 11	58 01

TRICALCITE FROM SHOSHONE COUNTY, IDAHO.

Some years ago the writer had occasion to visit the property of the Liberal King claim near the Lookout Mountain mine on the high mountain east of the Forks of Pine Creek in the Pine Creek district, Shoshone County, Idaho. The following account is abstracted from notes made at that time:

The upper tunnel of this property has developed a vein 6 to 8 feet wide, striking N. 80° W. and dipping 80° southwest. This vein consists of porous quartz inclosing much wall rock. Disseminated in moderate amount through this quartz are sulphides, mainly pyrite with less chalcopyrite and arsenopyrite and occasionally a little galena and sphalerite. The porosity of the quartz seems to be an original condition and not due to the solution or removal of any primary constituent of the vein. Some coarse-grained galena was seen in a lens of quartz on the hanging wall side of the main vein. Percolating waters have largely decomposed the surfaces of the chalcopyrite and pyrite masses, depositing a sooty black secondary sulphide or oxide of copper. More intense oxidation has colored the porous quartz by the formation of brilliant yellow, blue, and green coatings of secondary minerals. On the hanging wall of the quartz vein there is a pronounced fissure having a thoroughly



FIGS. 7-8.—7, OPTICAL AND CRYSTALLOGRAPHIC STRUCTURE OF TWINNED CRYSTAL OF TRICALCITE. 8, ORTHOGRAPHIC AND CLINOGRAPHIC DRAWINGS OF SIMPLE TABULAR CRYSTAL OF TRICALCITE.

crushed gouge, which is made up entirely of country rock with no drag quartz. Distributed along this fissure are streaks of fine-grained brown sphalerite or finely intergrown sphalerite and galena up to several inches wide.

On the dump of this tunnel there was, at that time, a large pile of the quartzose vein material, which was very highly colored with the secondary minerals mentioned above. These had the appearance of arsenates, and specimens collected at that time gave qualitative reactions for arsenic. The bulk of the coatings was exceedingly small, however, and, as no facilities for detailed investigation were available, the specimens became lost without their minerals being definitely identified.

Recently a typical specimen of this material from the Liberal King claim has been forwarded to the National Museum by the United States Geological Survey as a part of the collection of Mr.

Edward L. Jones, jr., illustrating his work in this district.³ The opportunity was thus offered for determining the mineralogical identity of the secondary arsenates which form the brilliant coatings.

The ore consists, as has been detailed above, of porous white quartz containing disseminated sulphides, including pyrite, chalcopyrite, and arsenopyrite, the latter in steel gray orthorhombic crystals. There is also some black sphalerite and perhaps a little enargite in the ore. The pyrite is partly coated by the black mineral, probably sooty chalcocite, and the quartz is brilliantly colored by thin films of a blue-green mineral with lesser amounts of a yellow-green to yellow mineral and an emerald-green crystalline one.

The most abundant of these, the blue-green mineral, has a vitreous to pearly luster and resembles tyrolite. It gave qualitative chemical reactions for copper and arsenic. At the request of the writer Mr. A. Rodolfo Martinez very kindly worked out the optical properties of this mineral, and by reference to Larsen's tables⁴ it was found to agree with the rare arsenate trichalcite, as shown by the following comparison:

Comparison of optical properties of trichalcite.

Pine Creek, Idaho (Martinez).	Turginsk, Urals (Larsen).
Color pale bluish-green.	Color pale bluish-green.
Nonpleochroic.	Nonpleochroic.
Biaxial.	Biaxial.
Sign negative (-).	Sign negative (-).
2V large.	2V large.
$\alpha = \text{---}$.	$\alpha = 1.67 \pm 0.01$.
$\beta = 1.688$.	$\beta = 1.686 \pm 0.003$.
$\gamma = \text{---}$.	$\gamma = 1.698 \pm 0.003$.
Birefringence medium low.	Birefringence 0.028
X normal to plates.	X normal to plates.

There is no other known mineral containing copper and arsenic acid which approaches these properties and, while it is regrettable that the mineral is not available in quantity sufficient for analysis, its identity can be considered as established by these data.

Upon examination of the specimen under a binocular microscope it was found that the mineral was in thin tabular crystals of hexagonal aspect, and although these were very minute it was found possible to measure two of them on the 2-circle goniometer. The basal pinacoid gave good signals, but the very narrow prismatic planes were more or less curved and irregular, yielding only approximate measurements, accurate perhaps to 1°. These indicated 60° angles for the prismatic zone, the mineral thus simulating hexagonal crystallographic

³Edward L. Jones, jr., A reconnaissance of the Pine Creek district, Idaho. U. S. Geol. Survey Bull. 710(a), pp. 1-36, 1919.

⁴Esper S. Larsen, jr., Microscopic determination of the nonopaque minerals. U. S. Geol. Survey Bull. 679, pp. 144 and 263, 1921.

symmetry. Examination in polarized light of the measured crystals shows these to be twins, as shown in Figure 7, made up of biaxial orthorhombic sectors. The sectors have interlocking boundaries. Each sector has a well-defined cleavage parallel to its free edge, and the extinction is parallel to this edge. Each sector gives in convergent light a perfectly centered biaxial interference figure. The several apparently prismatic planes of the pseudo-hexagonal tablet thus are evidently pinacoids of the several orthorhombic units which go to make up the twinned group. This may indicate that the orthorhombic form is an inversion product which is pseudomorphous after an original hexagonal form, but it is more probable that it is merely characteristic of trichalcite to form repeated twins, with the twinning plane the unit prism

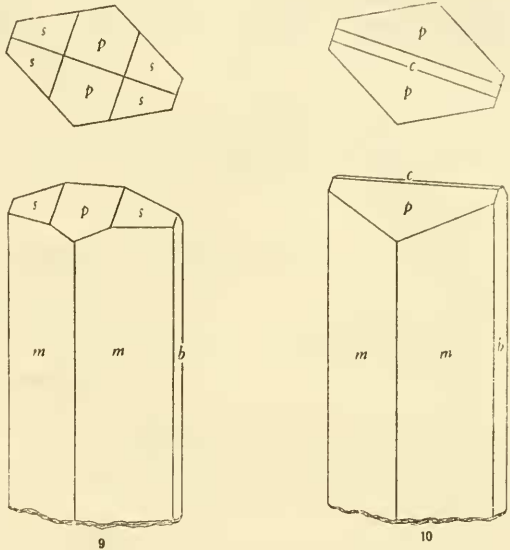
(110), which are pseudo-hexagonal. This is characteristic of a great many orthorhombic minerals whose prismatic angle approaches the hexagonal angle, as, for example, aragonite, witherite, cerrussite, chalcocite, etc. Figure 8 is drawn to show, in orthographic and clinographic projections, a crystal which, while having the same tabular habit, is untwinned.

Trichalcite has previously been known only from the original locality in the Urals, the Idaho

occurrence thus giving a second locality for this rare arsenate. The associated arsenates in the Idaho specimen have not been identified. These include a yellow-green material resembling scorodite and a green mineral resembling clinoclasite.

WAVELLITE CRYSTALS FROM ARKANSAS.

A specimen in the Museum collection (Cat. 45211) which shows minute white to brownish-white acicular crystals implanted singly and in groups over surfaces of gray-green variscite was labeled "natrolite on variscite." The specimen was received from Mr. Charles F. Brown and bore this label when received. The unusual association of a zeolite with a phosphate had not previously been noted, and this



FIGS. 9-10.—ORTHOGRAPHIC AND CLINOGRAPHIC DRAWINGS OF WAVELLITE CRYSTALS FROM ARKANSAS.

led to a preliminary optical examination which showed that the acicular crystals were not natrolite but were more probably tavistockite or wavellite. More detailed optical measurements made by Dr. E. S. Larsen indicated that, in all probability, the mineral was wavellite. The properties are as follows: Biaxial, positive (+), $2V$ medium large, ($\pm 60^\circ$). Dispersion $\rho > v$ so small as to be doubtful. $Z=c$. No principal optical directions perpendicular to the prism faces. Refractive indices $\alpha = 1.525 \pm 0.003$, $\beta = 1.534 \pm 0.003$, $\gamma = 1.545 \pm 0.003$. Birefringence 0.020 ± 0.003 . There are apparently three good cleavages normal to the principal optical directions.

In order that no question might remain regarding the identity of the material, such as could be spared without serious injury to the specimen was scraped off and examined chemically. Only 0.036 gram of pure material was available. This gave a loss on ignition of 30.09 per cent ($= H_2O + F$). The ignited mineral was fused with a large excess of sodium carbonate and the fusion leached with boiling water. The residue of insoluble material consisted of 0.0022 gram of Fe_2O_3 , possibly largely derived from reagents. It contained no lime. The filtrate gave abundant reactions for alumina and phosphoric acid.

Although the crystals were very minute, averaging perhaps $\frac{1}{2}$ mm. in length and one-fifth to one-tenth this in diameter, it was found possible, after several trials, to secure one which gave satisfactory measurements on the 2-circle goniometer. Since, as pointed out by Wherry,⁵ the axial ratios of wavellite are probably variable and are not accurately known beyond the third decimal place, the angles measured were used to calculate axial values for the best crystal measured from the Arkansas specimen. The measurements gave as follows:

Form.	Measurements.		Difference.		Average.	
	φ	ρ	φ	ρ	φ	ρ
<i>p</i> (101)	89 55	36 10	} 0 08	0 00	89 59	36 10
	90 03	36 10				
<i>s</i> (111)	60 26	40 06	} 0 25	0 17	60 28½	40 10
	60 15	40 18				
	60 33	40 14				
	60 40	40 01				

The values for p_0 derived from the two forms are not in satisfactory agreement; and since the faces of neither form gave conspicuously

⁵Edgar T. Wherry. Notes on mimetite, thaumasite, and wavellite. Proc. U. S. Nat. Mus., vol. 51, pp. 373-381, 1918.

superior measurements, it is necessary to take the mean value for p_0 , namely 0.7327. With this value assumed, the forms $s(111)$ and $m(110)$ yield for q_0 the values 0.4161 and 0.4112, respectively. Again, it is necessary to adopt the average of two values, and the axial values obtained for the crystal are as follows:

$$\begin{aligned} p_0 &= 0.7327 \\ q_0 &= .4136 \end{aligned}$$

$$\begin{aligned} a &= 0.5645 \\ c &= .4136 \end{aligned}$$

The above value for the a axis is practically identical with that of Wherry for the Pennsylvania material ($a=0.5640$), while the c axis is somewhat greater than Wherry's ($c=0.4040$). The present examination merely adds another observation to the four or five already available.

In habit the crystals of the Arkansas specimen are not unusual, as shown in Figure 9, the forms being $b(010)$, $m(110)$, $p(101)$, and $s(111)$, all prominently developed. There is a tendency for the crystals to aggregate in almost parallel position or in sheaves. The prismatic faces are slightly striated vertically. The angles measured on the only really satisfactory crystal examined are below compared with the angles calculated from the above derived values for the axes:

Calculated and measured angles of wavellite.

Letter.	Miller.	Symbol.	Measured.		Calculated.	
			φ	ρ	φ	ρ
b	(010)	$\infty 0$	0 06	90 00	0 00	90 00
b	(010)	$\infty 0$	0 06	90 00	0 00	90 00
m	(110)	∞	60 47	90 00	60 33	90 00
m	(110)	∞	60 46	90 00	60 33	90 00
m	(110)	∞	61 04	90 00	60 33	90 00
m	(110)	∞	60 53	90 00	60 33	90 00
p	(101)	10	89 55	36 10	90 00	36 14
p	(101)	10	90 03	36 10	90 00	36 14
s	(111)	1	60 26	40 06	60 33	40 05
s	(111)	1	60 15	40 18	60 33	40 05
s	(111)	1	60 33	40 14	60 33	40 05
s	(111)	1	60 40	40 01	60 33	40 05

In an endeavor to obtain further crystallographic data on the Arkansas wavellite a number of specimens of this material were examined. The best specimen from this locality in the Museum collections (Cat. 45866) consists of spherulitic aggregates of divergent crystals, which are transparent and of a beautiful sea-green color. Although in the body of the spherical group the crystals are deformed

by crowding, their terminations diverge sufficiently to permit idiomorphic development. Several trials, however, showed that these are totally unsuited for goniometric measurement, the prismatic planes being exceedingly wavy, while the broad faces of the dome $p(101)$ and the narrow faces of the basal pinacoid $c(001)$, while transparent, are etched to complete dullness and give only the faintest reflection and no signal whatever. Only qualitative measurements were obtained, and these indicate the forms present to be $b(010)$, $m(110)$, $p(101)$, and $c(001)$. The aspect is chisel-shaped, as shown in the drawing, Figure 10.

A SPECIES OF ROUND WORM (GONGYLONEMA) FROM
DOMESTIC SWINE IN THE UNITED STATES.

By EDWARD A. CHAPIN,

Of the Bureau of Animal Industry, United States Department of Agriculture.

In an examination of specimens of *Gongylonema* from American swine it was noted that there is a pronounced discrepancy between the spicule lengths of the species, which is common in swine in the United States, and the reported measurements of the same organs of *Gongylonema pulchrum* Molin, an European form supposed to occur in the New World. An examination of the available material showed that, as yet, the true *G. pulchrum* Molin is not represented among specimens collected in this country and deposited in the United States National Museum.

GONGYLONEMA RANSOMI Chapin.

Gongylonema ransomi CHAPIN, Journ. Amer. Vet. Asso., vol. 61, 1922, no. 1, p. 68, (Apr.)

Gongylonema. — Cuticle transversely striated; cuticular tubercles present in the anterior 1.0–1.3 mm. (female) or 0.6–0.9 mm. (male) of the body length (fig. 1), round, oval to nearly rectangular, arranged more or less regularly in rows. On the dorsal surface, between the lateral alae, there are four rows of tubercles, more or less evenly spaced one from another but somewhat concentrated near the dorsal line. Ventrally there are four complete rows of tubercles crowded toward the median line, with an incomplete row on either side, which is located between the external of the four rows and the lateral ala. Dorsal ala absent. Lateral alae short, extending a short distance beyond the posterior limit of the tubercles, slightly unequal in length. Cervical papillae situated on a craterlike depression upon a circular tubercle

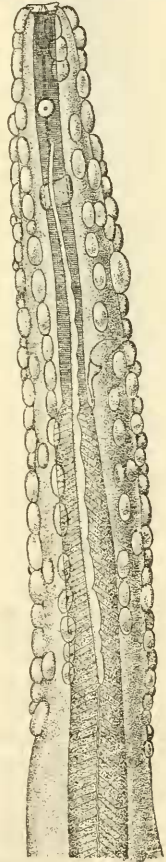


FIG. 1.—GONGYLONEMA RANSOMI. ANTERIOR EXTREMITY OF FEMALE (ENLARGED).

located just cephalad of the cephalic end of the lateral ala. Excretory pore opens *between* tubercles of the median ventral rows, or on a transverse scute as in other species, just cephalad of the junction of the nonmuscular and muscular portions of the esophagus. Nonmuscular portion of the esophagus short, about 0.5 mm. in female, 0.4 mm. in male. Muscular portion long, in female about 4.5 mm., much shorter (2.85 mm.) in male.

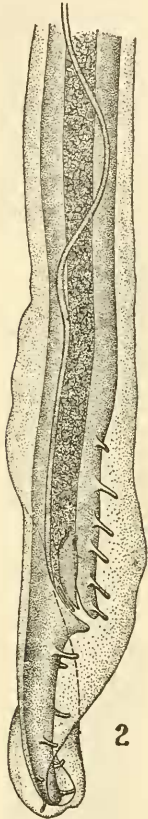


FIG. 2.—GONGYLONEMA RANSOMI. CAUDAL EXTREMITY OF MALE.

Male.—The caudal alae enclose the tip of the tail and are asymmetrical (fig. 2), the right wing being somewhat longer than the left. There are usually six preanal and four postanal papillae on each side, though the number varies. The anus is about 0.250 mm. from the tip of the tail. The caudal glands are subterminal. The right spicule (fig. 3) is short and stout, slightly curved and twisted, and measures 0.120 mm. between extremities in a straight line. The left spicule is very long, much thinner. It is about 10 mm. long. At its cephalic end it is infundibuliform, obliquely and irregularly emarginate. The "gorgeret" consists of two portions, a straight part, lying parallel to the short spicule and about 0.055 mm. long, and an oval part, lying dorsal of the spicules and directly back of the genital opening, about 0.029 mm. in diameter, giving a total length of 0.084 mm. for the organ.



FIG. 3.—GONGYLONEMA RANSOMI. SPICULES AND GORGERET OF MALE (ENLARGED).

Female.—The tail is rather blunt and slightly curved, with subterminal caudal glands. The anus is about 0.200 mm. from the tip of the tail. The vulva is slightly salient, 1.75 mm. from tip of tail. The vagina is long, extending cephalad from the vulva to about the middle of the body length. The uteri are divergent and extend nearly to the extremities of the worm, merging into the oviducts and ovaries at these points. Eggs ovoid, embryonated in vagina, averaging 55.5μ long by 32μ wide.

Table of measurements.

Organ. ¹	Male.	Female.
Esophagus:		
Nonmuscular.....	400	500
Muscular.....	2, 850	4, 500
Cervical papillae.....	122	145, 154
Posterior limit of tubercles.....	580-900	1, 010-1, 300
Long (left) spicule.....	10, 030
Short (right) spicule.....	106-130
Gorgeret.....	84
Vulva to tail.....	1, 750
Anus to tail.....	250	200
Eggs.....	53-58 x 31-33
Total length (average).....	23, 000	37, 000
Width at junction of esophagus and intestine.....	149. 4	190. 9

¹ All measurements in microns.

Location.—In burrows in the mucosa of the tongue and esophagus.

Locality.—United States: (East St. Louis, Illinois, National Stock Yards), collected by Dr. J. S. Jenison, May 7, 1921.

Host.—*Sus scrofa domestica*.

Type.—U.S.N.M. Helminthological Collections No. 24695.

The present species is easily separated from all known species of the genus except *G. verrucosum* Giles by the length of the left spicule; from *G. verrucosum* it is distinguished by the absence of a dorsal ala.

I have taken pleasure in dedicating this species to Dr. B. H. Ransom in recognition of his work on the nematodes of domestic animals.

THE NEOTROPICAL MUSCOID GENUS MESEMBRINELLA
GIGLIO-TOS AND OTHER TESTACEOUS
MUSCOID FLIES.

By J. M. ALDRICH,

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The appearance of Dr. J. M. R. Surcouf's large Revision des Muscidae Testaceae (1919) suggested a study of the American forms included therein, in the course of which additional information came to light regarding the Australian genus *Palpostoma*, included but not seen by Surcouf. Following a brief sketch of the Muscidae Testaceae as a taxonomic concept, and a synopsis of the genus *Palpostoma*, with three species, the present paper confines itself to a consideration of the American representatives, in the genera *Ormia*, *Chloroprocta*, *Hemilucilia*, and *Mesembrinella*; these are all exclusively neotropical.

The material herein described is all in the United States National Museum except as noted. Through the kindness of Maj. E. E. Austen some important specimens, including two new species, were borrowed from the British Museum. Professor Bezzi, of Turin, Italy, also sent for study several species from his collection, which had been determined by Doctor Surcouf. The important tropical collection of the American Museum of Natural History contained several species, which were placed at my disposal; Prof. O. A. Johannsen furnished representatives of eight species; Prof. James S. Hine sent specimens of *Mesembrinella bicolor* that he had himself collected in British Guiana; two new species were received from the Bavarian State collection through Dr. E. O. Engel; and Dr. W. M. Mann brought several specimens which he collected in Bolivia while a member of the Mulford Biological Exploration. Prior to these acquisitions and loans, the National Museum had purchased a considerable series from Pablo Schild, in Higuito, Costa Rica. In the interesting and important Australian genus *Palpostoma* the material was furnished by Dr. J. F. Illingworth and Dr. Gerald F. Hill.

Robineau-Desvoidy proposed the term Muscidae Testaceae (1830, p. 425) for four genera of muscoids which agreed in having non-

metallic testaceous or yellow color—*Bengalia*, *Phumosia*, *Ormia*, and *Palpostoma*. Macquart (1835, p. 248) lumped all these as subgenera under a new genus *Ochromyia*; later (1843, p. 276) he recognized *Bengalia* as a distinct genus. Brauer and Bergenstamm, in their final synopsis of the muscoid flies (1893, p. 178) tabulate *Ochromyia* and *Bengalia* together, omit *Ormia* and *Palpostoma* as unknown to them, and add two new genera, *Zonochroa* and *Auchmeromyia*. Brauer alone later (1895, p. 594) takes up the group again, adding the neotropical *Mesembrinella* Giglio-Tos and one new, *Hemilucilia*, from South America.

Including all the above genera and several more recent from the Old World, adding *Chloroprocta* Van der Wulp from tropical America and six new genera from the Eastern Hemisphere, Surcouf has constructed a modernized Muscidae Testaceae of 20 genera, 2 subgenera, and some 29 species. He includes without having seen them *Ormia* and *Palpostoma*, which, although included in 1830, are totally divergent forms, as shown by the material of both in the United States National Museum. Omitting these from the group, it still remains a question whether the remainder form a natural tribe. *Bengalia* would be the typical form around which the rest should be grouped if sufficiently related; and characters other than color would have to be found to unite them.

Villeneuve (1920, p. 225), criticizing Surcouf's grouping because the genera assembled are not sufficiently related to each other, tabulates the Calliphorinae *sens. lat.* and limits the Testaceae to Xanthocalliphorinae Villeneuve, new name—in which, however, he does not include either *Bengalia* or *Phumosia*, the foundation of Robineau's group. No American known genus would be included in Xanthocalliphorinae, even after adopting some changes suggested by Surcouf in an answer to the criticism.¹ Nor do I believe that any American genus can be associated with *Bengalia* or *Phumosia* in a natural group of smaller dimensions than Calliphorinae in the wide sense.

Without giving the other Old World genera further consideration here, I take up *Palpostoma* and pass to the neotropical forms.

Genus PALPOSTOMA Robineau-Desvoidy.

Palpostoma ROBINEAU-DESVOIDY, Myodaires, 1830, p. 429.

Opsophasiops TOWNSEND, Proc. Biol. Soc. Wash., vol. 28, 1915, p. 22; Insector Ins. Menst., vol. 3, 1915, p. 115, syn.

Palpostoma SURCOUF, Revision Musc. Test., 1919, p. 116, not seen.

The type and sole original species of *Palpostoma* is *testacea*, from Australia. The characters for both genus and species were given in a few words—arista barely pubescent; proboscis at tip with a pair

¹ Bull. Soc. Ent. France, 1920, p. 250.

of distinct, jointed palpi; apical cell petiolate; color wholly pale testaceous; transverse facial impression yellow; 3 lines long. The genus was not recognized from 1830 to 1915, as far as I know; in the latter year Townsend² identified it from Tasmania, a species which he regarded as *testacea* having been described by Coquillett (1900, p. 390) as *Myiophasia flava*. The 2 males described by Coquillett are in the United States National Museum, and 11 additional specimens of the genus have been received from Dr. J. F. Illingworth, all collected or reared at Cairns, North Queensland. The supposed labellar palpi are little soft posterior prolongations, which in drying assume various shapes, sometimes quite like palpi; they are not jointed, in spite of Robineau's assertion.

The generic characters are as follows:

Front very narrow in the male, in the female of *testacea* also very narrow, of *desvoidyi* 0.27 the head width. When the front is narrow there are no developed verticals, nor orbitals, but the female of *desvoidyi* has the usual two pairs of each, the latter small; ocellars very small, directed forward; frontals small, beginning well before ocellar triangle and reaching only to lunula; front not prominent; antennae ordinary, third joint about $2\frac{1}{2}$ times the second and reaching nearly to the vibrissae, which are somewhat above the mouth and a little approximated; facial ridges low and bare, a few short stubby hairs about the vibrissae; transverse impression large, extending below the eye to form most of the bucca, which is from one-fourth to one-third the eye height in profile; parafacial and parafacial narrow, with short but distinct hairs arranged somewhat in two or three rows, extending to the lower edge of the eye; back of head not bulging; proboscis small, palpi normal, labella as above noted. Thoracic chaetotaxy: acrostichal, anterior 1, posterior 1; dorsocentral, anterior 2-3, posterior 3; humeral 2; posthumeral 1; presutural 1; notopleural 2; supraalar 1; intraalar 1 (far back); postalar 2; scutellar, 1 apical, 1 lateral; prothoracic 1; mesopleural, 1 above, 1 anterior, 4 posterior; sternopleural, 1-2 anterior, 1 posterior; pteropleural, 1 small; hypopleural, row of 8 slender. All the specimens show a well-developed pair of prosternal bristles, a very unusual character.

Abdomen with dorsum curved downward apically on account of the shortness of the sternites; female without any apical piercing structures, showing seven sternites all of nearly equal length except the second which is longer; male with small genitalia; no discal bristles on intermediate segments.

Legs of ordinary structure, claws and pulvilli long in male, short in female; middle tibia with a small bristle on inner front side.

² Ins., Ins. Menst., vol. 3, 1915, p. 115

Wing with petiolate apical cell, the petiole only a little before the apex of the wing; third costal segment very short, much shorter than fifth; first vein bare, third with a few hairs.

In regard to the real relationships of this genus, it will be noted that Coquillett put his species in *Myiophasia*. Townsend in detecting the characters of *Palpostoma* in the specimens did not remove them from the drawer containing *Myiophasia* in the wide sense, and never published any comment on the proper position of the genus. It probably should stand in a tribe by itself.

TABLE OF SPECIES.

- Hind and apical cross veins parallel, or almost so..... *flava* Coquillett.
 Hind cross vein much less oblique than apical.
 Sternopleura in front of middle coxae with a double row of bristles and some smaller hairs, male with three sternopleurals at upper margin.
testacea Robineau-Desvoidy.
 Sternopleura in front of middle coxae bearing a single transverse row of bristles, male with only two sternopleurals at the upper margin... *desvoidyi*, new species

PALPOSTOMA TESTACEA Robineau-Desvoidy.

Palpostoma testacea ROBINEAU-DESVOIDY, *Myiodaires*, 1830. p. 429.

A wholly yellow species with a trace of median brown pollinose stripe on the abdomen, which is also sprinkled with brown dots from which the hairs and bristles arise. The second abdominal segment has a weak row of marginals, the third a stronger row, the fourth a few weaker. Hind cross vein a little oblique and at its anterior end incurved, especially in the male. The front of the female is at the narrowest only two-thirds as wide as in the male.

Length, 6 mm.

Five males, one female, Cairns, North Queensland, Australia, J. F. Illingworth, collector; four reared from adults of the Scarabeid beetle *Lepidoderma albohirtum* Waterhouse. Three males are returned to Doctor Illingworth.

I decide on this as *testacea*, since it is exactly the size mentioned by Robineau, and comes from Australia—excluding *flava* from consideration as not from the continent of Australia.

PALPOSTOMA FLAVA Coquillett.

Myiophasia flava COQUILLET, Proc. Linn. Soc. New South Wales, 1900, p. 390.

Opsophasiops flava TOWNSEND, Proc. Biol. Soc. Wash., vol. 28, 1915, p. 22.

Palpostoma testacea ROBINEAU-DESVOIDY, Townsend, *Insector Ins. Menst.*, 1915, p. 111.

The two males described by Coquillett have the front at narrowest only as wide as the anterior ocellus; the abdomen is spotted with

brown as in the preceding, and has a median brown line. Length, 4.7 mm. "West Australia; bred from adults of the Scarabeid *Anoplostethus opalinus* Burm." Coquillett suggests that *Neophasia picta* Brauer and Bergenstamm may be congeneric, founded on a female without antennae from West Australia.³ Their description, however, seems to show but little relationship.

Type and paratype.—Male, Cat. No. 10431. Both bear distinct printed labels, "Tasmania, Austr. Arthur M. Lee, collector." This disagrees with Coquillett's indicated locality.

PALPOSTOMA DESVOIDYI, new species.

Male.—Very similar to the two preceding, but differing by the characters given in the table; also by smaller size from *testacea*. Second abdominal segment with a pair of median marginals, a space between them and the other marginals.

Female.—Front 0.27 of head width above, slightly broader at antennae.

Length of male, 4.4 mm. to 5 mm.; of female, 6 mm.

Three males, two females, Cairns, North Queensland, Australia, J. F. Illingworth, collector. Two are reared from *Lepidiota frenchii* Blackburn, a scarabeid beetle injurious to sugar cane.

Type and allotype.—Male and female, Cat. No. 25242, U.S.N.M. One paratype of each sex is returned to Doctor Illingworth.

Genus ORMIA Robineau-Desvoidy.

Ormia ROBINEAU-DESVOIDY, Myodaires, 1830, p. 428.

Phasiopteryx BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 4, 1889, p. 146.

Neoptera VAN DER WULF, Biologia, Dipt., vol. 2, 1890, p. 165.

Euphasiopteryx TOWNSEND, Proc. Biol. Soc. Wash., vol. 28, 1915, p. 23.

Ormiophasisia TOWNSEND, Insecutor Ins. Menst., vol. 6, 1918, p. 164.

ORMIA PUNCTATA Robineau-Desvoidy.

Ormia punctata ROBINEAU-DESVOIDY, Myodaires, 1830, p. 428.—TOWNSEND, Ent. News, vol. 26, 1915, p. 366.

Phasiopteryx bilimeki BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 4, 1889 p. 147; pt. 6, 1893, p. 159.

Neoptera rufa VAN DER WULF, Biologia, Dipt., vol. 2, 1890, p. 165.

Clytiomyia punctata, new species, COQUILLET, Journ. N. Y. Ent. Soc., vol. 3, 1895, p. 52.

Oestrophasia punctata COQUILLET, Coquillett, Revision N. Amer. Tachin., 1897, p. 71.

This species, type of *Ormia*, was not seen by Surcouf. It is well represented in the United States National Museum collection from

³ Denkschr. Kais. Mus., 1893, p. 210.

Florida and Mexico. It is wholly unlike *Bengalia*, being a small Tachinid with bare arista; it is honey yellow in color, the epaulet at base of costa strikingly black and the small cross vein clouded; the prosternum is greatly swollen in both sexes, as in the Indian *Therobia abdominalis*, which is related. The male has an enormous thickening of the costa beyond the middle, and another in the second vein just behind it. There are probably two or three other species of *Ormia* in America, not at present well known.

Genus HEMILUCILIA Brauer.

Hemilucilia BRAUER, Sitzungsber. Kais. Akad. Wien, vol. 104, 1895, p. 104.—SURCOUF, Revis. Musc. Test., 1919, p. 54.

The type is *Musca segmentaria* Fabricius, the sole species included. It is much more closely related to *Chrysomyia* than to *Bengalia*, and is out of place in Surcouf's group. The face is vertical and the lower part of head strongly developed as in *Chrysomyia*, from which it differs chiefly in having the facial ridges very high and sharp, inclosing the antennae in a deep groove; the third antennal joint is very long, and the vibrissae are at the oral margin, only a little approximated to each other. The stem vein of the wing is ciliated behind, as in *Chrysomyia*, a character of decided generic value except apparently in *Mesembrinella*.⁴ Both species have the wings infuscated except a paler area in the middle third which does not reach the hind margin. Both *Hemilucilia* and *Cochliomyia* Townsend (type *maccellaria* Fabricius) differ from *Chrysomyia* in having the lower calypter bare above except at base, it being hairy to the edge in *marginalis* Wiedemann, the type of *Chrysomyia*.

TABLE OF SPECIES.

Humeri, postalar callosities and anterior part of mesopleura yellow; legs yellow; both thoracic spiracles pale yellow *segmentaria* Fabricius.
Humeri, etc., green or blue; legs mostly black; in female the front narrowing near the antennae; the metathoracic spiracle blackish..... *fuscanipennis* Macquart.

HEMILUCILIA SEGMENTARIA Fabricius.

Musca segmentaria FABRICIUS, Syst. Antl., 1805, p. 292.—WIEDEMANN, Auss. Zweifl. Ins., vol. 2, 1830, p. 401.

Chrysomyia hyacinthia ROBINEAU-DESVOIDY, Myiodaires, 1830, p. 450.

⁴ This character, first mentioned by Pandellè (Revue Ent., 1896, p. 213), afterwards by Villeneuve (Bull. Soc. Ent. France, 1913, p. 163, etc.), and later on by Rodhain and Bequaert (Bull. Sci. France et Belg., ser. 7, vol. 49, 1916, p. 244) is a very important one. The cilia are found on the large vein at the base of the wing behind the costa and basad of the humeral cross vein. I have found them in the following out of many genera examined: *Phormia* in the wide sense; *Chrysomyia* in the wide sense; all *Rhiniinae* of Townsend's 1917 Revision except *Pollenia*, which probably does not belong to the tribe; *Nitellia vespillo* Fabricius; *Sarconesia chloropyga* Wiedemann; *Phrissopodia splendens* Macquart; *Sarconesiopsis caerulea* Townsend; *Chlorobrachycoma splendida* Townsend; *Hemilucilia* and *Chloroprocta*. They never occur in *Lucilia* and *Calliphora*.

Lucilia segmentaria BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 5, 1891, p. 420 (in list).

Hemilucilia segmentaria BRAUER, Sitzungsber. Kais. Akad. Wien, vol. 104, 1895, p. 598.—SURCOUF, Revis. Musc. Test., 1919, p. 55.

All the published references are to material from South America. The species is represented in the United States National Museum by a male and four females, from Costa Rica, Panama, Peru, and Paraguay. Surcouf quotes the previous descriptions and gives a new one in detail from the type. The species is easily recognized by the characters already mentioned. The front in the male is black only at the vortex and much narrower outside the frontal bristles than in *macellaria*.

HEMILUCILIA FUSCANIPENNIS Macquart.

Lucilia fuscipennis MACQUART, Dipt. Exotiques, Suppl., vol. 4, pt. 2, 1851, p. 223.

Described from Bahia, Brazil; the United States National Museum has a male and four females, from Panama and Costa Rica, identified as *Phormia fuscipennis* by Coquillett, and placed in *Hemilucilia* by Townsend. It is a smaller and darker species than the preceding, the front black nearly to the antennae, where there is a sharp change to yellow.

Genus CHLOROPROCTA Van der Wulp.

Chloroprocta VAN DER WULP, Biol. Cent. Amer. Dipt., vol. 2, 1896, p. 296.

Nearly allied to *Cochliomyia* Townsend, with which it has in common the ciliation of the stem vein of the wing; vibrissae a little above the edge of the mouth and somewhat approximated to each other; acrostichal and dorsocentral bristles except the hindmost very small and hardly discernable; lower part of head strongly developed; face straight and almost vertical; frontals extending slightly below insertion of antennae; hind calypter bare beyond the fold. It differs in having the head much flatter (shorter on the longitudinal axis of the insect), more concave behind, the upper edge thin, especially in the male; the female has the parafrontals outside the frontal bristles much narrower; the male has the eyes contiguous for some distance, the upper front portion with very large facets as in males of *Tabanus*, as large as the posterior ocelli but not quite equalling the front one. The genus would certainly have to be placed in the same tribe with *Chrysomyia* and *Cochliomyia*.

CHLOROPROCTA SEMIVIRDIS Van der Wulp.

Chloroprocta semiviridis VAN DER WULP, Biol. Cent. Amer. Dipt., vol. 2, 1896, p. 296.

Two males and a female in the United States National Museum collection, from Costa Rica, Brownsville, Texas, and Colima, Mexico, determined by Townsend, show but little trace of the testaceous

color of the thorax mentioned so prominently by Van der Wulp; the base of the abdomen is yellow, however, and there are indications of red in the pleurae in all the specimens, the mesonotum nevertheless would have to be called blue green. Legs brownish red. Wings wholly infuscated, but darker apically near the costa.

MESEMBRINELLA Giglio-Tos.

Mesembrinella GIGLIO-TOS, Boll. Mus. Zool. ed. Anat. Comp. R. Univ., Torino, vol. 7, No. 132, p. 4 (Oct. 1892); Mem. R. Acad. Sci., Torino, ser. 2, vol. 45, 1895 (Ditt. del Mess., pt. 4), p. 11. Type, *Musca quadrilineata* Fabricius, by designation, 1892.

Mesembrinella BRAUER, Sitzber. Kais. Akad. Wiss., vol. 104, 1895, p. 594.

Huascaromusca TOWNSEND, Insector Ins. Menst., vol. 6, 1918, p. 155 (type *cruciata*, new, from Peru).

Ochromyia and *Mesembrinella* SURCOUF, Revis. Musc. Testaceae, 1919, p. 63.

We still have to consider as American representatives of Surcouf's group his *Ochromyia* and *Mesembrinella*. His use of both names is open to question. The type of *Ochromyia* was distinctly designated at its first publication as *Musca jejuna* Fabricius. This species from Surcouf's examination of the type is a *Bengalia*, and in fact the only species known of this genus, of which all Desvoidy's names are probably synonymous (although Surcouf mentions only *testacea*, designating it as type of *Bengalia*,⁵ omitting the others from consideration). Obviously *Ochromyia*, 1835, is a synonym of *Bengalia*, 1830, having the same genotype. Now *Mesembrinella* also has a genotype, designated when it was first published, which is *Musca quadrilineata* Fabricius. This species from the type Surcouf places in *Ochromyia*. This situation would seem to require the transfer of the name *Mesembrinella* from Surcouf's group of that name to his *Ochromyias*, left without a name by making *Ochromyia* a synonym of *Bengalia*. There is, however, an alternative which largely does away with the confusion which a transfer would entail, namely, the union of both genera as taken by Surcouf under the name *Mesembrinella*. A consideration of the generic characters used by Surcouf shows that this is not only practicable but unavoidable. He separated the genera on the presence of one anterior sternopleural in *Ochromyia* and two in *Mesembrinella*, both groups having also one posterior. The commonest Central American species varies frequently between one and two anterior sternopleurals, the lower when present sometimes very small, hardly more than a hair. Other characters seem to be merely specific.

The combination gives a natural genus having several species in the neotropical region.

⁵ Townsend, Ins. Ins. Menst., vol. 4, 1916, p. 6, had already designated *Bengalia labiata* as type, but this is no doubt the same species.

Generic characters: hypopleural bristles present, arista plumose to tip, eyes bare, bend of fourth vein obtuse and broadly rounded, thence straight and ending only a little before the apex of wing (if there is any concavity at all it is just at the tip, not immediately after the bend); first posterior cell wide and broadly open, sometimes very broadly; frontal bristles not continuing below insertion of antennae; female with a pair of decussate bristles on the frontal stripe, below the ocelli; eyes bare; bucca narrow, about one-fifth to one-sixth eye height; first and second abdominal segments without median marginals; no discals except in two species on the fourth segment. They are easily separated from *Calliphora* by the course of the fourth vein, the much narrower bucca, the arista plumose to the tip, hind calypter bare above, and in the female decussate bristles on the front.

The two species herein identified as *Mesembrinella bicolor* Fabricius and *bellardiana*, new species, are fairly common in collections (I have examined approximately 50 of the former, 12 of the latter), but it is a very difficult matter to get enough of the others to determine the value of the characters. Both of the common species vary in the number of sternopleurals; posterior acrostichals may apparently vary from one to three pairs; a third humeral is usually present, but often small and sometimes merely hairlike; the foremost anterior dorso-central also may be small, so there is no real difference worth mentioning between two and three in this series; supraalars seem to vary from two to four in the same species; there may be two lateral scutellars or only one. On the other hand, there seems to be more constancy in the color of the wings than would be expected; the second presutural is regularly present in some species, absent in others; while one or two pairs of anterior acrostichals as compared with none seems to be a stable character. Color of the legs, as in *brunnipes*, I view with misgiving, but have too little material to prove anything.

The presence or absence of the second presutural bristle separates two very natural groups, the former including the type species; the absence of this bristle is generally accompanied by the absence of the second posthumeral, but the latter is well developed in *cruciata* and almost as well in *facialis*. The second presutural when present is mesad of the large outer presutural, which is always present, and a little behind the middle of a line drawn from the outer one to the dorsocentral, which is just before the suture. The posthumeral, which, as stated, usually varies with this, occurs halfway between the outer presutural and the humeral swelling.